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UNIVERSITY OF NAMIBIA

FACULTY OF AGRICULTURE,ENGINEERING & NATURAL SCIENCES

School of Agriculture & Fisheries Science

PROSPECTUS 2026

Open your mind

PROSPECTUS 2026

FACULTY OF AGRICULTURE, ENGINEERING AND NATURAL SCIENCES

SCHOOL

OF

AGRICULTURE

AND

FISHERIES SCIENCES

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University of Namibia, Windhoek

NOTE

This School Prospectus is valid for 2026 only. Regulations and curricula may be amended without prior notice. General regulations and information appear in the General Information and Regulations Prospectus.

Although the information contained in this School Prospectus has been compiled as accurately as possible, Council and Senate accept no responsibility for any errors and omissions that may occur. The University retains the right to amend any regulation or condition without prior notice.

The information is correct up to 31 October 2026.

The fact that particulars of a specific programme, subject or module have been included in this School Prospectus does not necessarily mean that such a programme, subject or module will be offered in 2026 or any subsequent year.

This School Prospectus must be read in conjunction with the General Information and Regulations Prospectus.

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SCHOOL PREAMBLE

MISSION

The Mission of the School of Agriculture and Fisheries Sciences is to promote sustainable agricultural and natural resource development and management in Namibia through teaching, research and extension services to communal and commercial farming communities.

OBJECTIVES

The objectives of the School are:

- to provide education and training, aimed at producing degree level graduates in the fields of Agriculture and Natural Resources, who will be well equipped with knowledge, skills and attitudes that will help improve agricultural productivity and promote sustainable agricultural development, wise use of resources and increase Namibia's food security;
- to conduct research aimed at extending the frontiers of knowledge relevant to Namibia's environment, natural resources and agriculture.
- to provide advisory, consultancy and extension services on the proper and sustainable use of Namibia's agricultural and natural resources to the communities.
- to catalyze increased production and productivity of Namibia's natural resources.
- to help create meaningful employment in both the public and private sector including self-employment; and
- to promote an environment that will enhance equity and access to education and training in Agriculture and Natural Resources development and management.

"Training & Research to Feed the Nation"

REGISTRATION AND ACADEMIC ADMINISTRATION DATES

JANUARY 2026	
Dates	**Activity**
05 January	**ONLINE REGISTRATION COMMENCES:** • **All Senior Students (until 30 Jan 2026)**
08 January	**Institution opens (all administrative staff)**
12 January	**REGISTRATION COMMENCES:** • **First year students (freshmen) until (30 Jan 2026)** • **CORE SEMESTER (New Curriculum Professional Programmes) commences 21 January** • **CORE SEMESTER (New Curriculum Programme) commences 28 February**
19 January	**Professional Programmes Semesters** **Lectures commence for FIRST SEMESTER**
26 January	**REGISTRATION COMMENCES:** • **Postgraduate Students (Masters and Doctorate Degrees) (until 30 Jan 2026)** **ACADEMIC ADMINISTRATION – Application for module(s) exemptions commence** • **First year student (until 13 February)** • **Senior students (until 27 March)**
30 January	**REGISTRATION ENDS:** • **First year students (freshmen) and new curriculum students**

FEBRUARY 2026	
DATES	**ACTIVITY**
02 February	**LATE REGISTRATION Commences (until 06 February)** • **All first year and senior new curriculum students**
06 February	**LATE REGISTRATION ends for:** • **All first year and senior new curriculum students**
13 February	**ACADEMIC ADMINISTRATION** • **Last day for module(s) exemption applications – first year students** • **Last day for approval of module(s) and qualification offering types changes - First year students**

MARCH 2026	
DATES	**ACTIVITY**
27 March	**ACADEMIC ADMINISTRATION – Application for module(s) exemption ends**

APRIL 2026	
DATE	**ACTIVITY**
09 April	**GRADUATION: Southern Campus**
14 April	**GRADUATION: Katima Mulilo Campus**
16 April	**GRADUATION: Rundu Campus**
22 April	**GRADUATION: Northen Campuses**
27 April	**ACADEMIC ADMINISTRATION – Last day to change offering types for year modules**

JULY 2026	
DATE	**ACTIVITY**
20 July	**ACADEMIC ADMINISTRATION – Addition and cancellation of SECOND SEMESTER modules commence (until 24 July)**
24 July	**ACADEMIC ADMINISTRATION – Addition and cancellation of SECOND SEMESTER modules end**

SEPTEMBER 2026	
DATE	**ACTIVITY**
11 September	**ACADEMIC ADMINISTRATION** • **Last day to submit outstanding documentation** • **Last day to change offering types for SECOND SEMESTER modules end**

October 2026	
DATE	**ACTIVITY**

08 October	**SPRING GRADUATION**

CANCELLATION DATES

DATE	**ACTIVITY**
30 January	**Last day to cancel CORE SEMESTER modules with 100% credit**
13 February	**Last day to cancel CORE SEMESTER modules with 50% credit**
20 February	**Last day to cancel CORE SEMESTER modules – no credit** **Last day to cancel FIRST SEMESTER modules with 100% credit (Old curriculum students)**
13 March	**Last day to cancel FIRS SEMESTER and year modules with 100% credit (New curriculum students)** **Last day to cancel FIRST SEMESTER modules with 50% credit (Old curriculum students)**
13 April	**Last day to cancel FIRST SEMESTER modules with 50% credit (New curriculum students**
27 April	**Last day to cancel FIRST SEMESTER modules – no credit (All students)**
06 July	**Last day to cancel YEAR modules with 50% (All students)**
10 August	**Last day to cancel SEMESTER 2 modules with 100% (All students)**
28 September	**Last day to cancel SEMESTER 2 and YEAR modules – no credit (All students)**

STRUCTURE AND PERSONNEL OF THE SCHOOL

ACADEMIC STAFF BY CAMPUSES AND DEAN'S OFFICE

EXECUTIVE DEAN: FACULTY OF AGRICULTURE, ENGINEERING & NATURAL RESOURCES
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HEAD OF DEPARTMENT: CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES (OGONGO CAMPUS)
Prof S K Awala: National Dip Agric (Neudamm); B.Sc. Agric (UNAM), M. Agric. Sc. (Nagoya Univ., Japan); PhD Agric. Sc. (Kindai Univ., Japan).
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Matters regarding specific subjects and departments should be addressed to the relevant Head of Department.

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Faculty Officer	Ms Belinda Bock: Bachelor in Business Administration (Hons) (UNAM), Dipl.in Information Administration (NUST)
Examinations Officer:	Ms Ervinia Basson: Bachelor in Business Administration (Hons) (UNAM); Postgraduate Diploma in Education (IOL)
Campus Librarian:	Ms NST Uugwanga: BA Library Science & Records Management & History (UNAM); Postgraduate Diploma in Library & Information Studies (UCT); Master of Library and Information Studies (UCT)
Assistant Librarian:	Ms.Jaqueline //Garoes: B Arts: Information Science (UNISA); (Hons) Information Science (UNAM); Master of Library and Information Science (UNAM)
Senior Library Assistant:	Mr T Ntesa: Dipl Information Studies (UNAM); B Arts: Information Science (UNISA)
Library Assistant:	Mr K G Uamunika: Dipl Information Science (UNAM)

Library Assistant:	Mrs M Kaahangoro: Dipl Records Management (Southern Business School); B Arts: Information Science (UNISA)
Administrative Assistant:	Ms Aune Hango: Dipl. In Business Administration (Unam)

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Student Support Officer:	Mr. A. Kandjimi: BA (UNAM), Dip. Local Government Studies(UNAM), Certificate in Procurement(AMAD University)
Farm Manager:	Mr E Beukes: National Dipl. Agric (Tsumis)
IT Support Technician:	Mr G. Shikongo: Degree in Information Technology (Networking and System Administration) (LINGUA); Diploma in Computer Science (UNAM)
Administrative Assistant:	Vacant
Student Finance Officer:	Ms M Mubukwanu: Degree Finance Manager (Hons) (IUM)
Estates Officer:	Alfeus Nkandanga Matheus: B.Sc.(Honors) Civil Engineering
Supervisor Workshop:	Mr. M Nambala: Certificate in Diesel Mechanic
Supervisor: Small Stock	Mr A Tjiriange: National Dip. Agric (Unam, Ogongo Campus)
Supervisor: Agronomy	Mr B M Matomola: Bachelor Degree in Agricultural Management; National Dip. Agric (Neudamm)
Supervisor: Intensive Unit	Mr H Izaacs: National Dip. Agric (Neudamm)
Supervisor: Largestock Unit	Mr G Sheehama: National Dip. Agric(Ogongo), Higher Diploma in Education (North West University), B. Hons Agric Extension (University of Pretoria)
Assistant Supervisor: Workshop	Mr G /Gomxob: Trade Dip. Diesel Mechanic
Assistant Supervisor: Large Stock	Vacant
Assistant Supervisor: Small Stock	Mr R Fredericks: Grade 12
Assistant Supervisor: Meat Processing	Mr R Kandjou: Grade 12
Assistant Supervisor: Intensive Unit	Mr I Lisias: Diploma in Agriculture

OGONGO CAMPUS

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Campus Administrator:	Mr. M. Nghihangwa: B-Tech (Unisa) Master in Public Admin (Univ Western Cape)
Assistant Faculty Officer:	Ms Josefina Muhama: Bachelor of Science in Agriculture (NUST), Hons Degree in Agribusiness Management (NUST), Postgraduate Diploma in Management (NUST)
Student Support Officer:	Vacant
Campus Nurse :	Mr Phillips Dewald Hoeseb Dip General Nursing Science &Midwifery Science (UNAM) : Post Graduate Pharmacotherapy (Unam)
IT Support Technician	Mr Timoteus Negonga: Bachelor of Information Technology (NUST), CompTIA A+, N+
Examinations Officer:	Ms J Amupolo: B. Econ (Unam); B.Econ (Hons) Univ Western Cape
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Library Assistant:	Ms T N Andowa
Library Assistant:	Ms S Shiimbi: Dipl Information Studies
Library Assistant:	Vacant
Secretary to the Campus Director	Ms H.T. Utoni: International Computer Driving Licence ICDL, (UNAM), Certificate in HIV/AIDS counselling (UNAM), Diploma in Public Relations (UNAM), Certificate in IT (SchoolNet Namibia), Certificate in Marketing (SME Compete)
Campus Security Officer	Mr. Ananias Michael Ambambi: Certificate in Policing (Institute for Open Learning), Bachelor of Police Practice (Southern Business School).
Security Officer	Mr. Robert Nyambe
Farm Manager, Ogongo Campus:	Mr. S. Martin: National Dipl Agric (Neudamm); B Sc Agric (Univ Free State, Bloemfontein)
Supervisor: (Dairy, Poultry and Food Processing).	Mr. A. Malyenge: Dipl Agric (Ogongo); Dipl in total quality Management production (UNISA); BSc (Hons) Food Science and Technology (Putra University, Malaysi
Supervisor: (Horticulture)	Mr. M. Shishwandu; Dipl Agric (Ogongo Agricultural College); Bachelor of Agric Management (Polytechnic of Namibia)

Supervisor: (Cereal)	Vacant
Supervisor: (Natural Resources)	Mr. Stefanus Amunyela: Dipl (Agric) in Natural Resources (Ogongo Agricultural College).
Assistant Supervisor: (Natural Resources)	Ms. Beata S David: Dipl (Agric) in Natural Resources (UNAM, Ogongo Campus)
Supervisor: (Livestock).	Mr. D.H. Shikola: Dipl Agric (Ogongo Agricultural College); Bachelor of Agric Management (Livestock) (Polytechnic of Namibia)
Supervisor: (Workshop).	Vacant
Assistant Supervisor: (Workshop).	Mr. Frans Titus: Certificate in Basic Electrical course (VTC)

ACADEMIC STAFF BY DEPARTMENTS

DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS (NEUDAMM CAMPUS)

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Professor:	Prof H. J. Sartorius von Bach, B.Sc. Agric Economics (cum laude) (University of Pretoria); B.Sc. (Hons) Agric Economics (cum laude) (Pr etoria); M.Sc. Agric Economics (Pretoria); PhD Agric Economics (Pretoria)
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Associate Professor:	Vacant
Associate Professor:	Prof E. Lutaaya: B.Sc. Agric. (Makerere); M.Sc. Animal Breeding (Texas A & M); PhD Animal and Dairy Science [Quantitative Genetics] (University of Georgia, USA).
Senior Lecturer:	Dr N. P. Petrus: B. Agric. (Animal Science) University of Nigeria Nsukka, Nigeria; M.Sc. (CIRAD- Montpellie (France), Animal production in the tropics; PhD Poultry (Nutrition and Genetic characterization) (UNAM).
Senior Lecturer:	Dr S. P. Muteka: B.Sc. (Concordia, Minnesota, USA)), M.Sc. (Reproductive Biology) [University of Pretoria, RSA), PhD (Reproductive Biology) [University of Pretoria, RSA]
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Lecturer:	Vacant
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Lecturer:	Mr. F. N. Shindume B.Sc. (Hons) in Food Biotechnology (ASTU, Russian Federation); M.Sc. Industrial Biochemistry (UNAM)
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Lecturer:	Dr B. Gorejena: BVSc (University of Zimbabwe); MBA (Assam Don Bosco University); MSc Veterinary Tropical Diseases (Global One Health) (University of Pretoria)
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Lecturer:	Mrs S. Shivolo-Useb: Nat Dip Agric (Neudamm); B. Econ (UNAM); MBA-Finance (UNAM)
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Senior Lecturer	Dr S C Chukwu: Certificate in Computer Training (Methodist College Nneochi, Nigeria); B. Agric Crop Sc., M.Sc. Crop Sc. (Ebonyi State Univ., Nigeria); PhD. Crop Sc. (Univ. Putra Malaysia).
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Lecturer	Mr. K Elungi: B.Sc. Agric (UNAM); M.Sc. Plant Pathology (UKZN); MBA (NUST Harold Graduate School of Business).
Lecturer	Vacant
Lecturer	Mr G Hatutale: B.Sc. Agric (UNAM), M.Sc. Horticulture (Free State Univ).
Lecturer	Mr J Chigariro: Dipl Agric (Gwebi, Zim); PGDipl Grain Storage Management (UK); M Sc Grain Storage Management (Greenwich University, UK).
Lecturer	Mr L Nuugulu: B.Sc Agric Crop (UNAM); B Sc (Hons) Agronomy (Univ of Free State); MSc Horticulture (Univ Free State).
Lecturer	Ms C K Kamburona-Ngavtene: B.Sc. Agric (UNAM); MSc. Genetics (Pretoria).
Lecturer	Ms H Kandongo: B.Sc. Agric Mechanisation (Karl Marx University); MSc Agric (UNAM).
Lecturer	Ms H N Nafuka: B.Sc. Mathematics and Physics (Honours); M.Sc. Mathematics (UNAM).
Senior Technologist	Ms A N Aluvilu: National Dip. Agric (Polytechnic of Namibia); B. Tech Agric (Cape Technikon), M. Agric (University of Limpopo).
Technologist	Mr R Shou: National Diploma in Agric (Ogongo); B Sc in Agric (Hon) Crop Science (UNAM)
Laboratory Manager	Vacant
Technologist	Ms F N T Shigwedha, B.Sc. (Hons). (UNAM).

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Head: Academic Affairs	Prof N N Gabriel : B.Sc. (UNAM), M.Sc. (NAU. China), PhD (UNAM)
Office Administrator:	Ms E Uahindua: Secretarial Certificate (CCOSA - Zimbabwe)
Assistant Faculty Officer:	Ms. S Shapumba: BA: Industrial Psychology and Sociology Hons (UNAM), MA in Development Studies (UNAM)
Assistant Librarian:	Ms. W N Uukongo: Dipl in Library and Information Science (UNAM), B.A Library in Library and Information Science (UNAM), MA inLibrary Information Science
Library Assistant:	Mr E Thaniseb: Dipl Library and Information Studies (Univ of Botswana)
Estates Officer:	Mr. M. Dominicus: Dipl (WVTC)
Campus Security Officer	Mr. T.L Silumbu
Campus Administrator:	Vacant
Student Records Officer & Examination Officer:	Mr M Kangootui: Adult Basic Education & Training Certificate (ABET), UNISA; Dipl Public Management (Polytechnic of Namibia)
IT Officer:	Mr. Fillemon Nime
Associate Professor:	Prof. Tamuka Nhiwatiwa (BSc (University of Zimbabwe), MPhil (University of Zimbabwe), PhD (KU Leuven, Belgium)
Associate Professor:	Prof J A Iitembu: B.Sc. (UNAM), M.Sc. (Univ. of Tromso), PhD (Rhodes), LLB (UNAM)
Associate Professor:	Prof. NN Gabriel: B.Sc. (UNAM), M.Sc (NAU, China), PhD (UNAM)
Senior Lecturer:	Prof. M Wilhelm: B.Sc (Hons), M.Sc, PhD (UCT, South Africa)
Senior Lecturer:	Dr S K Mafwila: B.Sc. (UNAM); PGDE (UNAM); B.Sc.Hons (Rhodes); M.Sc. (UCT), PhD (UCT)
Senior Lecturer:	Dr. D N Jacobus: B.Sc (UNAM), M.Sc UNAM & Humboldt University, PhD (UNAM)
Senior Lecturer	Vacant
Lecturer:	Mr. L Kandjengo: B.Sc (UNAM), B.Sc Hons (UCT), M.Sc (UCT)
Lecturer:	Mr M Tjipute: M.Sc (ASTU), PGC (UNU), PDHE (UNAM)
Technologist:	Mrs E N Frans: BSc. (Honours) Microbiology (UNAM)
Technologist	Ms. VK Kapula: B.Sc (Hons), M.Sc (UNAM)

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Senior Lecturer:	Vacant
Senior Lecturer:	Dr P Hiwilepo-van Hal: B Sc Agric, Food Science & Technology (UNAM); M Sc, PhD Food Science (Wageningen)
Lecturer:	Mr. C. Samundengu: B Eng.(UNZA); B Eng. Hons, M Eng.(Univ Pretoria); Posgraduate Dipl Bus Admin (UNAM); M Sc Acc & Finance (UNAM)
Lecturer:	Dr S C Barrion: B Sc Agric, Food Science & Technology (UNAM); B Sc Hons Food Science (Univ Pretoria); M Sc (Distinction) Food Science & Technology (Univ Pretoria); PhD in Nutritional Sciences (University of Surrey)
Lecturer:	Ms M J Kandjou: B Sc Agric, Food Science & Technology (UNAM); M Sc Dairy Science & Technology (Univ Zimbabwe)
Lecturer:	Mr S Emvula: B Sc Agric Food Science & Technology (Unam); M Sc Food Science (Stellenbosch); Postgraduate Diploma in Higher Education (UNAM)
Senior Technologist:	Ms W V Kanime: National Dipl Agric (Ogongo); B Sc Agric, Food Science & Technology (UNAM); M Sc Food Science (Stellenbosch), Adv Dipl in Business Project Mgt (UCT)
Senior Technologist: (UNAM)	Ms M H Hamunyela: B Sc Microbiology & Biochemistry (UNAM); MSc Biology

General enquiries regarding the programmes offered by the School of Agriculture and Fisheries Sciences should be directed to:

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A. QUALIFICATIONS OFFERED BY THE SCHOOL

The School may offer the following diploma and degree programmes:

A.1 UNDERGRADUATE PROGRAMMES

A.1.1 Diplomas

(Code)		Minimum Duration	
(New Curriculum)			
(31DCPT)	Diploma in Sustainable Crop Production and Technologies	3 years	full-time
(31DLP)	Diploma in Livestock Production	3 years	full-time
(Old Curriculum)			
(17HDAG)	Diploma in Agriculture	3 years	full-time

A.1.2 Degrees

(Code)		Minimum Duration	
(New Curriculum)			
(31BSAE)	Bachelor of Science in Agricultural Economics (Level 7)	3 years	full-time
(31BSCP)	Bachelor of Science in Crop Production (Level 7)	3 years	full-time
(31BFOS)	Bachelor of Science in Fisheries and Ocean Sciences (Level 7)	3 years	full-time
(31BSAS)	Bachelor of Science in Animal Science (Hons)	4 years	full-time
(31BHAE)	Bachelor of Science in Agricultural Engineering (Hons)	4 years	full-time
(31BHFT)	Bachelor of Science in Food Science and Technology (Hons)	4 years	full-time
(31BSAM)	Bachelor of Science in Agribusiness Management (Hons)	1 year	full-time
(31BSAP)	Bachelor of Science in Agricultural Policy Analysis (Hons)	1 year	full-time
(31BHEE)	Bachelor of Science in Agricultural Extension (Hons)	1 year	full-time
(31BFOH)	Bachelor of Science in Fisheries and Ocean Sciences (Hons)	1 year	full-time
(31BSAH)	Bachelor of Science in Agronomy (Hons)	1 year	full-time
(31HHCP)	Bachelor of Science in Horticulture (Hons)	1 year	full-time
(31HCCP)	Bachelor of Science in Crop Improvement & Seed Systems (Hons)	1 year	full-time
(Old Curriculum)			
(17BSAE)	Bachelor of Science in Agricultural Economics (Hons)	4years	full-time
(17BSAS)	B.Sc in Agriculture (Animal Science) (Hons)	4 years	full-time
(17BSCS)	Bachelor of Science in Agriculture (Crop Science)	4 years	full-time
(17BSFS)	B.Sc in Agriculture (Food Science) (Hons)	4 years	full-time
(17BSFA)	Bachelor of Science in Aquatic Sciences(Hons)	4 years	full-time

A.2 POSTGRADUATE PROGRAMMES

(Code)		Minimum Duration

(New Curriculum)

(31MSAE)	Master of Science in Agricultural Economics	2	years	full-time
(31MSAB)	Master of Science in Animal Breeding	2	years	full-time
(31MSAN)	Master of Science in Animal Nutrition	2	years	full-time
(31MSAR)	Master of Science in Rangeland Resources & Pasture Sciences	2	years	full-time
(31PHAS)	Doctor of Philosophy in Animal Science	3	years	full-time
(31PHAE)	Doctor of Philosophy in Agricultural Economics	3	years	full-time
(31DPFS)	Doctor of Philosophy in Food Science	3	years	full-time
(31DPFO)	Doctor of Philosophy in Fisheries and Ocean Sciences	3	years	full-time
(31DPCS)	Doctor of Philosophy in Crop Science	3	years	full-time

(Old Curriculum

(17MSRR)	Master of Science in Rangeland Resources Management	2	years	full-time
(17MSAG)	Master of Science in Agriculture (By Thesis)	2	years	full-time
(17MSFA)	Master of Science in Fisheries and Aquatic Science (By Thesis)	2	years	full-time
(17DPAG)	Doctor of Philosophy in Agriculture	3	years	full-time
(17DPFA)	Doctor of Philosophy in Fisheries and Aquatic Science	3	years	full-time

B. REGULATIONS

The regulations of the School of Agriculture and Fisheries Sciences should be read in conjunction with and subject to the General regulations of the University of Namibia contained in the General Information and Regulations Prospectus.

B.1 GENERAL ADMISSION CRITERIA FOR UNDERGRADUATE PROGRAMMES

B.1.1 DIPLOMA PROGRAMMES

B.1.1.1 Diploma in Livestock Production (level 6)

To be admitted into the **Diploma in Livestock Production (level 6)**, a candidate should have obtained the following grades at NSSCAS/NSSCO level, or equivalents from a recognized qualification:

Subject to School Specific Regulations, the normal basic requirement for entrance to the
Diploma in Livestock Production programme shall be:
A pass in five different subjects as below with the combination of the following subjects including English: Agriculture, Biology, Mathematics, Chemistry, Physics or Physical Science
2 subjects on NSSCAS level and obtained a "e" or higher,

- 3 subjects on NSSCO level with a D or higher,
- English must be at minimum D grade on NSSCO level

Admission criteria based on school leaving certificate prior to 2021.
Subject to school special regulation, the normal basic requirement for entrance to Diploma in Livestock Production shall be:
A pass in five different subjects as follows:

(i) On ordinary level (NSSCO) with a minimum of 24 points on the UNAM Evaluation Scale, with English at a minimum D at NSSCO level.

OR

(ii) With a combination of ordinary (NSSCO) and higher (NSSCH) level with a minimum of 24 points on the UNAM Evaluation Scale with English at a minimum D at NSSCO level.

In both (i) and (ii) English must be a minimum of a D symbol at NSSCO level with the following subject combination: Mathematic, Agriculture/Biology, Physics/Chemistry/Physical Science and any other subjects.

B.1.1.2 Diploma in Sustainable Crop Production and Technologies (Level 6)

To be admitted into the **Diploma in Sustainable Crop Production and Technologies (Level 6)** programme, a candidate should have obtained the following grades at NSSCAS/NSSCO level or equivalents from a recognized qualification:

Subject to School-Specific Regulations, the normal basic requirement for entrance to the Diploma in Sustainable Crop Production and Technologies programme shall be:

A pass in five different subjects as follows:

- 2 subjects on NSSCAS level and obtained an "e" or higher, including Agriculture/Biology and one of Mathematics, Physics/Chemistry,
- 3 subjects on NSSCO level with a D or higher, and should include Mathematics, and Agriculture/Biology.
- English must be at minimum D grade on the NSSCO level

Admission criteria based on school leaving certificate before 2021

Subject to school special regulation, the normal basic requirement for entrance to Diploma in Sustainable Crop Production and Technologies shall be:
A pass in five different subjects as follows:

(i) On the ordinary level (NSSCO) with a minimum of 24 points on the UNAM Evaluation Scale, with English at a minimum D at the NSSCO level.

OR

(ii) With a combination of the ordinary (NSSCO) and higher (NSSCH) level with a minimum of 24 points on the UNAM Evaluation Scale with English at a minimum D at the NSSCO level.
In both (a) and (b) English must be a minimum of a D symbol at the NSSCO level and the following subject combination: Mathematic, Agriculture/Biology, Physics/Chemistry/Physical Science and any other subjects.

B.1.1 (A) Mature Age Entry Scheme

Candidates may also be admitted into the above Diploma Programmes through the Mature Age provision if they meet the following conditions:

a) They should be at least 25 years old on the first day of the academic year in which admission is sought;
b) They should have completed junior secondary school education (i.e. grade 10);
c) They should have proof of at least five years of relevant work experience;
d) They should pass all papers of the prescribed Mature Age Entry tests with a minimum of 50%.

Meeting the minimum admission requirements does not necessarily ensure admission. Admission is based on the number of places available and is awarded on the basis of merit after a rigorous selection process. The School reserves the right to interview candidates before admission.

B.1.2 UNDERGRADUATE DEGREE PROGRAMMES

B.1.2.1 Bachelor of Science in Agricultural Economics degree

Subject to School Specific Regulations, the normal basic requirement for entrance into the Bachelor of Science in Agricultural Economics degree programme shall be:

I. A pass in five different subjects as follows:
(a) Two (2) subjects on NSSCAS level with an average "d" or higher including one of Mathematics, Biology, or Agriculture
(b) Three (3) subjects on NSSCO level with a "C" or higher in Mathematics, Biology and Agriculture.
(c) English must be a minimum "C" at the NSSCO level
(d) The five subjects must include English and Mathematics.

Or

II. A pass in five different subjects as follows:
(a) Three (3) subjects on NSSCAS level with an average "d" or higher including Mathematics, Biology, or Agriculture
(b) Two (2) subjects on NSSCO level with a "D" or higher including Mathematics, Biology and Agriculture
(c) English must be a minimum "C" at the NSSCO level
(d) The five subjects must include English and Mathematics.

III. Candidates with a three-year Diploma in Agriculture or other related fields at NQF Level 5 from a recognized and accredited institution may be granted admission to the Bachelor of Science in Agricultural Economics degree programme. Such candidates may be exempted from certain modules in the degree programme provided that the equivalent module(s) was/were passed with an average of 60% or higher.

IV. Candidates with a relevant Diploma at NQF level 6, maybe exempted from certain modules in the degree programme provided that the equivalent module(s) completed.

B.1.2.2 Bachelor of Crop Production degree

To be admitted into the Bachelor of Crop Production degree, a candidate should have obtained the following grades at NSSCAS/NSSCO level or equivalents from a recognized qualification:
Subject to School-Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Crop Production Degree** programme shall be:

- Two (2) subjects on the NSSCAS level and obtained a "d" or higher, including Agriculture/Biology and one of Mathematics, Physics/Chemistry,
- Three (3) subjects on NSSCO level with a C or higher and should include at least one of Mathematics, and Agriculture/Biology.
- English must be at minimum C grade on the NSSCO level

OR

- Three (3) subjects on NSSCAS level with a "d" including Biology and one of Mathematics, Physics/Chemistry.
- Two (2) subjects on NSSCO level with a D or higher and should include at least one of Mathematics, and Agriculture/Biology.
- English must be at minimum C grade on the NSSCO level

I. Applicants in possession of a **Diploma in Sustainable Crop Production and Technologies** or an equivalent qualification at NQF Level 6 are eligible to apply for the Bachelor of Science in Crop Production degree programme. The applicants will be admitted based on a pass at the diploma level and will be exempted from 147 (37%) of the 395 total credits of the Bachelor of Science in Crop Production degree programme.

B.1.2.3 Bachelor of Science in Fisheries and Ocean Sciences

Subject to School Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Science in Fisheries and Ocean Sciences** programmes shall apply.

Notwithstanding the above, students may be recruited into the Bachelor of Science in Fisheries and Ocean Sciences via two paths:

I. A pass in five different subjects as follows:
(a) 2 subjects on NSSCAS level with an average d or higher
(b) 3 subjects on NSSCO level with a C or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

Or

II. A pass in five different subjects as follows:
(a) 3 subjects on NSSCAS level with an average d or higher
(b) 2 subjects on NSSCO level with a D or higher
(c) English must be at minimum C at NSSCO level

(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

Admission criteria based on school leaving certificate prior to 2021 shall be:

i. A pass in five different subjects as follows:
(a) 2 subjects on higher level (NSSCH) with a 4 or higher
(b) 3 subjects on ordinary level (NSSCO) with a C or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

Or

ii. A pass in five different subjects as follows:
(a) 3 subjects on higher level (NSSCH) with a 4 or higher
(b) 2 subjects on ordinary level (NSSCO) with a D or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

ARTICULATION OPTIONS

The graduate of this program will articulate into the various NQF level (8) Bachelor of Science qualification honours in related fields (marine science/biology, ocean governance, aquaculture, etc).

B.1.2.4 Bachelor of Science in Animal Science Honours

To be admitted into the **Bachelor of Science in Animal Science Honours**, a candidate should have obtained the following grades at NSSCAS/NSSCO level, or equivalents from a recognized qualification:

I. A pass in five different subjects as follows:
(a) 2 subjects on NSSCAS level and obtained a "d" or higher, including Mathematics and at least any one of Biology or Agriculture.
(b) 3 subjects on NSSCO level with a C or higher, and should include Mathematics and at least any two of Biology, Agriculture or Physical Science (Physics/Chemistry).
(c) English must be at minimum C grade on NSSCO level

Or

II. A pass in five different subjects as follows:
(a) 3 subjects on NSSCAS level with a "d" or higher, including Mathematics and at least any two of Biology, Agriculture or Physical Science (Chemistry/Physics)
(b) 2 subjects on NSSCO level with a D or higher, including Mathematics and at least any one of Biology or Agriculture.
(c) English must be at minimum C grade on NSSCO level

For applicants with school leaving certificates obtained prior to 2021, the requirements of the UNAM admission, students' recruitment and registration policy will apply: Subject to School Special Regulations, the normal basic requirement for entrance to the Bachelor of Science in Animal Science Honours shall be:

III. A pass in five different subjects as follows:
(a) 2 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 3 subjects on ordinary level (NSSCO) with a C or higher in Mathematics and Biology, and at least a "D" symbol in either Physical Science, Chemistry or Physics
(c) English must be at minimum C at NSSCO level

Or

IV. A pass in five different subjects as follows:
(a) 3 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 2 subjects on ordinary level (NSSCO) with a D or higher symbol in either Physical Science, Biology, Chemistry or Physics.
(c) English must be at minimum C at NSSCO level.

B.1.2.5 Bachelor of Science in Agricultural Engineering Honours

To be admitted into the Bachelor of Science in Agricultural Engineering Honours. A candidate should have obtained the
following grades at NSSCAS/NSSCO level or equivalence from a recognized qualification.

(a) 3 subjects (Mathematics, Physics and Chemistry) on NSSCAS level with an average grade of "c" in each subject or higher
(b) 2 subjects on NSSCO level with "C" average or higher, and
(c) English must be at minimum "C'' at NSSCO level.

For applicants with school leaving certificates obtained prior to 2021, the requirements of the UNAM admission, students recruitments and registration policy will apply. Subject to school specific regulation, the normal basic requirement for entrance to the Bachelor of Science in Agricultural Engineering Honours program shall be a pass in 5 different subjects as follows:

(a) 2 subjects (Mathematics, Physical Science) on NSSCAS level with an average grade of "2" in each subject or higher

(b) 3 subjects on NSSCO level with "C" average or higher, and
(c) English must be at minimum "C'' at NSSCO level.

ALTERNATIVE PATHWAYS TO ADMISSION

Successful Completion of Pre-Engineering Program
Students who do not meet the minimum admission entry requirements into the Bachelor of Science in Mechanical Engineering can opt to enroll into the Pre-Engineering Program offered at the University of Namibia. A student from the Pre-Engineering program will be admitted into the Bachelor of Science in Electrical Engineering if they meet the following requirements:
(a) A minimum average of 60% in all Chemistry support modules
(b) A minimum average of 60% in all Physics Support modules
(c) A minimum average of 60% in all Mathematics support modules

B.1.2.6 Bachelor of Science in Food Science and Technology Honours

To be admitted into the Bachelor of Science in Food Science and Technology Honours, a candidate should have obtained the following grades at National Senior Secondary Certificate Advanced Subsidiary Level (NSSCAS)/ National Senior Secondary Certificate Ordinary (NSSCO) level, or equivalents from a recognized qualification:

Subject to School Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Science in Food Science and Technology Honours** programmes shall be:

I. A pass in five different subjects as follows:
(a) 2 subjects on NSSCAS level and obtained a "d" or higher, including Biology and one of Mathematics, Physics/Chemistry
(b) 3 subjects on NSSCO level with a C or higher, and should include at least one of Mathematics, and Physics/Chemistry.
(c) English must be at minimum C grade on NSSCO level

Or

II. A pass in five different subjects as follows:
(a) 3 subjects on NSSCAS level with a "d" including Biology and one of Mathematics, Physics/Chemistry.
(b) 2 subjects on NSSCO level with a D or higher, and should include at least one of Mathematics, and Physics/Chemistry.
(c) English must be at minimum C grade on NSSCO level

(2) For applicants with school leaving certificates obtained prior to 2021, the requirements of the UNAM admission, students recruitment and registration policy will apply: Subject to School Special Regulations, the normal basic requirement for entrance to Bachelor of Science in Food Science and Technology Honours programme shall be:

III. A pass in five different subjects as follows:
(a) 2 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 3 subjects on ordinary level (NSSCO) with a C or higher in Mathematics and Biology, and at least a "D" symbol in either Physical Science, Chemistry or Physics
(c) English must be at minimum C at NSSCO level

Or

(iv) A pass in five different subjects as follows:
(a) 3 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 2 subjects on ordinary level (NSSCO) with a D or higher symbol in either Physical Science, Biology, Chemistry or Physics.
(c) English must be at minimum C at NSSCO level.

(iv) Extended enrolment:
(a) Candidates that qualify for admission to the University but lack the appropriate subjects on NSSCAS (or grades), as outlined above, for admission to the programme can opt to rather enrol for the Extended mode of this programme that will take one year longer.
(b) Candidates in possession of a valid Namibian Senior Secondary Certificate (NSSC) issued prior to 2021 (only) and has a pass in 5 different subjects, as outlined below, can enrol in the Extended mode of this programme:

B.1.2(A) Mature Age Entry Scheme

Applicants aspiring for admission to the Degree programmes through the Mature Age Entry Scheme must satisfy the following conditions:
Applicants aspiring for admission to the degree programme through the Mature Age Entry Scheme must satisfy the following conditions:
(1) They should be at least 25 years old on the first day of the academic year in which admission is sought;
(2) Applicants should have completed at least junior secondary education for admission into the degree programme
(3) They should normally have proof of at least five years of relevant work experience.

The Mature Age Entry Examination will consist of three / four papers:

a) Paper 1: An English Proficiency Paper;
b) Paper 2: A General Knowledge Paper;
c) Paper 3: A Numerical Ability Paper;
d) Paper 4: A Faculty-Specific Paper (where applicable).

Subject to Programme Specific Regulations Mature Age Entry applicants seeking admission into the degree programme shall score an average of at least 50% with no paper less than 50%. Applicants who meet the Mature Age Entry qualifying requirements and passed the Mature Age Entry examination may be called for an additional interview before the final selection is made.

Subject to School Specific Regulations, the normal basic requirement for entrance to The Bachelor of Science in Food Science and Technology Honours programmes shall be

B.1(A) MATURE AGE ENTRY SCHEME FOR UNDERGRADUATE DEGREE AND DIPLOMA PROGRAMMES

Admission can also be considered for persons who qualify through the Mature Age Entry Scheme upon successful completion of the relevant examinations as set out in the General Information & Regulations Prospectus.
Candidates who, in the opinion of the examiners, merit further consideration, may be called for an oral interview before the final selection is made.

B.2 CONDUCT OF THE PROGRAMMES

B.2.1 First year BSc in Agricultural Economics, BSc in Animal Science, BSc in Fisheries and Ocean Sciences, BSc in Crop Production students admitted into the School will start their first to fourth year at Neudamm or Ogongo or Sam Nuuyoma Campus. BSc in Food Science and Technology Honours students admitted into the School will spend the first year at the University's Main Campus. The students will continue with their professional training in the second year at Neudamm.
BSc in Agricultural Engeneering students admitted into the School will spend the first and second year at José Eduardo dos Santos Campus. The students will continue with their professional training in the third year at Ogongo Campus.

B.2.2 A student may, with the approval of the Dean and after consultation with the Head of the Department, change his/her study option for which he/she is registered. As specified in the General Regulations, a student may not change qualifications or study options later than the dates specified.

B.2.3 A student may, with the approval of the School and Department, take modules from other Schools provided that doing so will not affect his or her programme of study.

B.2.4 The following undergraduate Diploma programmes may be offered:
- Diploma in Sustainable Crop Production and Technologies
- Diploma in Livestock Production
(Ogongo Campus);

B.2.5 The following undergraduate degree programmes may be offered:
- Bachelor of Science in Agricultural Economics (Level 7)
- Bachelor of Science in Crop Production (Level 7)
- Bachelor of Science in Fisheries and Ocean Sciences (Level 7)
- Bachelor of Science in Animal Science (Hons)
- Bachelor of Science in Agricultural Engineering (Hons)
- Bachelor of Science in Food Science and Technology (Hons)

B.2.6 The following M Sc and Phd degree programme may be offered:
- Master of Science in Rangeland Resources Management (course work);
- Master of Science in Agriculture (by Thesis);
- Master of Science in Fisheries and Aquatic Science (By Thesis)
- Doctor of Philosophy in Agriculture
- Doctor of Philosophy in Fisheries and Aquatic Science
- Doctor of Philisophy in Agriculture

B.3 DURATION OF STUDY (UNDERGRADUATE PROGRAMMES)

B.3.1 Subject to the provisions of School Special Regulations the minimum duration of full-time study for a Bachelor's degree (Hons) shall normally be four years, and that of the Bachelor's degree (Level 7) /Diploma normally three years.

B.3.2 The maximum period of full-time study for a Bachelor's degree or a Diploma, is the minimum full-time period of study for that Degree or Diploma plus two years.

B.4 MODULE STRUCTURE AND CODING

B.4.1 Modules are coded with three alpha codes denoting the field of study as well as the Department under which a module is offered, for example: AEC (Agricultural Economics), ASC (Animal Science), CSC (Crop Science), FAS (Fisheries & Ocean Sciences)), FST (Food Science & Technology),
The three alpha codes are followed by four numeric codes denoting the following:

1st numeric code:	qualification type
2nd numeric code:	NQF level
3rd numeric code:	module size (module type)
4th numeric code:	semester in which the module is offered

B.5 FIELD ATTACHMENT REGULATIONS

B.5.1 Diploma students will be required to go for their Field Attachment after successful completion of their second year of study. Degree students will be required to go for their first Field Attachment after successful completion of their second year, whereas they will go for their second Field Attachment after successful completion of their third year.

B.5.2 Attached students should be punctual at all times, must keep and leave accommodation provided to them clean, and report any breakages and damages caused to properties to their site supervisors, as well as maintain a positive attitude towards others and their work.

B.5.3 Students are required to stay on duty till the last day of the attachment period. Failure to do so may result in the repetition of the attachment at student's own cost. Absence from the site of duty may only be authorized by the site management in writing. Weekends should be considered part of the attachment period, therefore students on attachment may be required to report for duty during weekends should the need arise.

B.5.4 Field Attachment will be assessed based on i) written attachment report and ii) an oral presentation.

B.6 ASSESSMENT

B.6.1 General Examination Regulations as set out in the General Information & Regulations Prospectus shall apply.
B.6.2 Unless otherwise stipulated in these regulations, module assessment for the diploma and undergraduate degree programmes will be as follows:

C. PROGRAMME PER DEPARTMENT

C.1 DIPLOMA PROGRAMMES

Continuous assessment mark will constitute a weighting of 60% of the final mark while examination will constitute a weighting of 40% of the final mark for modules consisting of lectures and practicals.

MINIMUM REQUIREMENTS FOR RE-ADMISSION INTO THE SCHOOL

To be re-admitted into the School, a student must have passed the minimum number of credits as indicated below By programmes:

C.1.1 DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS

C.1.1.1 DIPLOMA IN LIVESTOCK PRODUCTION

To be re-admitted into the Diploma in Livestock Production, a student must have successfully completed the following minimum number of credits as indicated below:

(a) 38 credits (of which 24 must be non-core) by the end of the first year of registration.
(b) 128 credits by the end of the second year of registration.
(c) 217 credits by the end of the third year of registration.
(d) 321 credits by the end of the fourth year of registration
(e) The Diploma in Livestock Production must be completed after a maximum of 5 years of registration unless a student applies and got approval for deferment by the University.

C.1.2 DEPARTMENTOF CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES

C.1.2.1 DIPLOMA IN SUSTAINABLE CROP PRODUCTION AND TECHNOLOGIES

To be re-admitted to the Diploma in Sustainable Crop Production and Technologies, a student must have completed the following minimum number of credits as indicated below:

(a) 40 credits (of which 24 must be non-core) by the end of the first year of registration
(b) 122 credits by the end of the second year of registration
(c) 228 credits by the end of the third year of registration
(d) 336 credits by the end of the fourth year of registration

THE PROGRAMME MUST BE COMPLETED AFTER A MAXIMUM OF 5 YEARS OF REGISTRATION UNLESS A STUDENT APPLIES AND GOT APPROVAL FOR DEFERMENT FROM THE UNIVERSITY.

C.1.2(OUT) DIPLOMA IN AGRICULTURE (Phased out from 2023)

(a) 48 credits by the end of the 1st Year; of which 16 is non-Unam core;
(b) 128 credits by the end of the 2nd Year;
(c) 216 credits by the end of 3rd Year;
(d) 280 credits by the end of the 4th Year.

C.2 UNDERGRADUATE DEGREE PROGRAMMES

Continuous assessment mark will constitute a weighting of 40% of the final mark while examination will constitute a weighting of 60% of the final mark for modules consisting of the lectures and practicals
Continuous Assessment will include at least 2 written tests and 1 assignment, including practical reports.

C.2.1 DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS

C.2.1.1 BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS (Level 7)

To be re-admitted into the programme, a student must have passed the minimum number of credits as indicated below:

(a) 40 credits (of which 24 must be non-core) by the end of the First Year of registration
(b) 126 credits by the end of the Second Year of registration
(c) 216 credits by the end of the Third Year of registration
(d) 327 by the end of the Fourth Year of registration.

The programme must be completed after a maximum of 5 years of registration

C.2.1.2 BACHELOR OF SCIENCE IN ANIMAL SCIENCE HONOURS

To be re-admitted into the Bachelor of Science in Animal Science Honours, a student must have successfully completed the following minimum number of credits as indicated below:

(a) 40 credits (of which 24 must be non-core) by the end of the first year of registration.
(b) 133 credits by the end of the second year of registration.
(c) 230 credits by the end of the third year of registration.
(d) 340 credits by the end of the fourth year of registration.
(e) 437 credits by the end of the fifth year of registration.

The programme must be completed after a maximum of 6 years after registration.

C.2.1.3 BACHELOR OF SCIENCE IN AGRICULTURAL POLICY ANALYSIS (HONOURS)

To be re-admitted into the programme, a student must have passed the minimum number of credits as indicated below:

- 51 credits by the end of the First Year of registration
- 51 credits by the end of the Second Year of registration

The programme must be completed after a maximum of 2 years of registration

C.2.1.4 BACHELOR OF SCIENCE IN AGRIBUSINESS MANAGEMENT (HONOURS)

To be re-admitted into the programme, a student must have passed the minimum number of credits as indicated below:

- 54 credits by the end of the First Year of registration
- 90 credits by the end of the Second Year of registration

The programme must be completed after a maximum of 3 years of registration.

C.2.1.5 BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSION (HONOURS)

To be re-admitted to the Bachelor of Science in Agricultural Extension Honours for a second year of registration, a student must have passed a minimum of 76 credits by the end of the first year. The programme must be completed after a maximum of 2 years of registration.

C.2.2 DEPARTMENT OF FISHERIES AND OCEAN SCIENCES

C.2.2.1 BACHELOR OF SCIENCE IN FISHERIES AND OCEAN SCIENCES (LEVEL 7)

To be re-admitted into the programme, a student must have passed the minimum number of credits as indicated below:

(a) 39 credits (of which 24 must be non-core) by the end of the First Year of registration
(b) 133 credits by the end of the Second Year of registration
(c) 230 credits by the end of the Third Year of registration
(d) 343 by the end of the Fourth Year of registration.
The programme must be completed after a maximum of 5 years of registration

C.2.2.2 BACHELOR OF SCIENCE IN FISHERIES AND OCEAN SCIENCE HONOURS (LEVEL 8)

To be re-admitted into the BSc (FAS) programme, a student must have passed at least:

(a) 48 credits by the end of the 1st Year, of which 16 is non-Unam core;
(b) 152 credits by the end of the 2nd Year;
(c) 256 credits by the end of the 3rd Year;
(d) 352 credits by the end of the 4th Year;
(e) 416 credits by the end of the 5th Year.

C.2.3 DEPARTMENT OF FOOD SCIENCE AND SYSTEMS

C.2.3.1 BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY HONOURS

Normal enrollment

To be re-admitted into the Bachelor of Science in Food Science and Technology Honours, a student must have successfully completed the following minimum number of credits as indicated below:

(a) 40 credits (of which 24 must be non-core) by the end of the first year of registration.
(b) 130 credits by the end of the second year of registration.
(c) 228 credits by the end of the third year of registration.
(d) 341 credits by the end of the fourth year of registration.
(e) 433 credits by the end of the fifth year of registration.
The programme must be completed after a maximum of 6 years of registration

Extended enrollment

The following re-admission regulations will apply to students enrolled for the extended programme:
To be re-admitted, the student must have successfully completed the following minimum number of credits as indicated below:

(a) 32 credits (of which 26 must be non-core) by the end of the first year of registration
(b) 106 credits by the end of the second year of registration
(c) 190 credits by the end of the third year of registration
(d) 287 credits by the end of the fourth year of registration
(e) 350 credits by the end of the fifth year of registration
(f) 397 credits by the end of the sixth year of registration.

The programme must be completed after a maximum of 7 years of registration

To be re-admitted into the BSc (FST) programme, a student must have passed at least:

(a) 56 credits by the end of the 1st Year, of which 16 is non-Unam core;
(b) 152 credits by the end of the 2nd Year;
(c) 248 credits by the end of the 3rd Year;
(d) 336 credits by the end of the 4th Year;
(e) 400 credits by the end of the 5th Year.

C.2.4 DEPARTMENT OF CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES

C.2.4.1 BACHELOR OF SCIENCE CROP PRODUCTION (LEVEL 7)

To be re-admitted into the Bachelor of Science in Crop Production programme, a student must have passed at least:

(a) 40 credits (of which 24 must be non-core) by the end of the first year of registration
(b) 137 credits by the end of the second year of registration
(c) 236 credits by the end of the third year of registration
(d) 354 credits by the end of the fourth year of registration

The programme must be completed after a maximum of 5 years of registration

C.2.4.2 BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING HONOURS

To be re-admitted into the Bachelor of Science in Agricultural Engineering Honours, a student must have successfully completed the following minimum number of credits as indicated below:

(a) 48 credits (of which 24 must be non-core) by the end of the first year of registration.
(b) 161 credits by the end of the second year of registration.
(c) 284 credits by the end of the third year of registration.
(d) 415 credits by the end of the fourth year of registration.
(e) 564 credits by the end of the fifth year of registration.
(f) 588 credits by the end of the sixth year of registration

The programme must be completed after a maximum of 6 years after registration.

C.2.4.3 BACHELOR OF SCIENCE IN AGRONOMY (HONOURS)

To be re-admitted into the Bachelor of Science in Agronomy Honours, a student must have passed the minimum number of 82 credits by the end of the first year of registration. The programme must be completed within a maximum of 2 years of registration.

C.2.4.4 BACHELOR OF SCIENCE IN CROP IMPROVEMENT AND SEED SYSTEMS HONOURS (LEVEL 8)

To be re-admitted into the Bachelor of Science in Crop Improvement and Seed Systems Honours, a student must have passed the minimum number of 82 credits by the end of the first year of registration. The programme must be completed within a maximum of 2 years of registration.

C.2.4.5 BACHELOR OF SCIENCE IN HORTICULTURE HONOURS

To be re-admitted into the Bachelor of Science in Horticulture Honours, a student must have passed the minimum number of 82 credits by the end of the first year of registration. The programme must be completed within a maximum of 2 years of registration.

D. ACADEMIC ADVANCEMENT REGULATIONS PER DEPARTMENT

A student advances to the following academic year of study have to fulfill the following criteria as stated by programs below. In all cases, pre-requisites for modules have to be passed before a student can proceed to register for modules that require prerequisites.

D.1 DIPLOMA PROGRAMMES

D.1.1 DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS

D.1.1.1 DIPLOMA IN LIVESTOCK PRODUCTION

First Year to Second Year

(a) To proceed to second year, a student must have passed At least 90 credits by the end of the First Year (2/3 of total first-year credits).

(b) A student who has obtained at least 56 credits, but less than 89 credits will be allowed to register for a maximum of 61 credits in the second year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to third year a student must have passed At least 213 credits by the end of the Second Year (all first-year modules plus 85 credits of the Second Year).

(b) A student who has obtained at least 54 credits but less than 84 credits of Year 2, will be allowed to register for a maximum of 58 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

D.1.2 DEPARTMENTOF CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES

D.1.2.1 DIPLOMA IN SUSTAINABLE CROP PRODUCTION AND TECHNOLOGIES

First Year to Second Year

(a) To proceed to second year, a student must have passed At least 91 credits by the end of the First Year (2/3 of total first-year credits). A student who has obtained at least 60 credits, but less than 90 credits will be allowed to register for a maximum of 52 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to second year, a student must have passed At least 217 credits by the end of the Second Year (all first-year modules plus 81 (2/3) credits of the second year).

(b) A student who has obtained at least 60 credits but less than 80 credits of year 2, will be allowed to register for a maximum of 60 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

D.1.2(OUT) DIPLOMA IN AGRICULTURE (Phased out from 2023)

First Year to Second Year

(a) To proceed to second year, a student must have passed at least 88 credits prescribed in first year (67% of the total 132 credits in first year).

(b) A student who has obtained at least 48 but less than 56 credits by the end of first year, shall not progress to the second year, but re-register for all outstanding modules in the first year. Such student will not register for any modules in the second year.

(c) A student who has obtained at least 56 credits but less than 88 credits by the end of first year shall repeat the first year, but will be allowed to register for a maximum of 48 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to third year, a student must have passed all 132 credits prescribed in the first year, and at least 83 credits of second year (67% of the total 124 credits in second year) to be able to register for Third Year.

(b) A student who has not cleared all first year modules by the end of the second year will not be allowed to register for any third year modules.

(c) A student who has passed all first year modules and obtained at least 48 but less than 80 credits in the second year shall repeat the second year, but will allowed to register for a maximum of 48 credits in the third year in addition to the failed modules provided that the relevant pre-requisites have been passed.

D.2 UNDERGRADUATE DEGREE PROGRAMMES

Continuous assessment mark will constitute a weighting of 40% of the final mark while examination will constitute a weighting of 60% of the final mark for modules consisting of the lectures and practicals
Continuous Assessment will include at least 2 written tests and 1 assignment, including practical reports.

D.2.1 DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS

D.2.1.1 BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS (Level 7)

First Year to Second Year

A student advances to the subsequent academic year of study when the following conditions have been met:

(a) At least 84 credits by the end of the First Year (2/3 of total first-year credits).

(b) A student who has obtained at least 60 credits, but less than 83 credits will be allowed to register for a maximum of 52 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) At least 214 credits by the end of the Second Year (all first-year modules plus 88 (2/3) credits of the second year).

(b) A student who has obtained at least 60 credits but less than 87 credits of year 2, will be allowed to register for a maximum of 60 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

D.2.1.2(A) BACHELOR OF SCIENCE IN ANIMAL SCIENCE HONOURS

A student advances to the subsequent academic year of study when the following conditions have been met:

First Year to Second Year

(a) At least 89 credits by the end of the First Year (2/3 of total first-year credits).

(b) A student who has obtained at least 54 credits, but less than 88 credits will be allowed to register for a maximum of 61 credits in the second year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) At least 219 credits by the end of the Second Year (all first-year modules plus 86 credits of the second year).

(b) A student who has obtained at least 55 credits but less than 85 credits of year 2, will be allowed to register for a maximum of 58 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

Third Year to Fourth Year

(a) At least 354 credits by the end of the Third Year (all first and second year-modules plus, plus 92 credits of the third year).

(b) A student who has obtained at least 57 credits but less than 91 credits of year 3, will be allowed to register for a maximum of 59 credits in the fourth year in addition to the failed modules of the third year provided that the relevant pre-requisites have been passed.

D.2.1.2(B) BACHELOR OF SCIENCE IN AGRICULTURE (ANIMAL SCIENCE) HONOURS (Phased out)

First Year to Second Year

(a) To proceed to second year, a student must have passed at least 96 credits prescribed in the first year (67% of the total 136 credits in first year).

(b) A student who has obtained a minimum of 48 but less than 56 credits by the end of the first year shall not progress to second year, but re-register for all outstanding first year modules. Such student will not be allowed to register for any modules in the second year.

(c) A student who has obtained at least 56 credits but less than 96 credits by the end of first year shall repeat the year, but will be allowed to register for a maximum of 48 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to third year, a student must have passed at least 50% of the remaining first year credits and at least 96 credits in the second year (75% of the total 128 credits in second year).

(b) A student who has obtained at least 48 but less than 56 second year credits shall repeat the second year and re-register for all outstanding modules. Such student will not be allowed register for any modules in the third year.

(c) A student who has obtained at least 56 but less than 96 second year credits shall repeat the second year, but will be allowed to register for a maximum of 48 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

Third Year to Forth Year

(a) To proceed to fourth year, a student must pass all first year modules, and at least 50% of the remaining second year credits. In addition, the student must have passed at least 104 third year credits (75% of the total 140 credits in third year).

D.2.1.5 BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS (HONOURS) (Phased out)

First Year to Second Year

(a) To proceed to second year, a student must have passed at least 96 credits prescribed in the first year (67% of the total 136 credits in first year).

(b) A student who has obtained a minimum of 48 but less than 56 credits by the end of the first year shall not progress to second year, but re-register for all outstanding first year modules. Such student will not be allowed to register for any modules in the second year.

(c) A student who has obtained at least 56 credits but less than 96 credits by the end of first year shall repeat the year, but will be allowed to register for a maximum of 48 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to third year, a student must have passed at least 50% of the remaining first year credits and at least 96 credits in the second year (75% of the total 128 credits in second year).

(b) A student who has obtained at least 48 but less than 56 second year credits shall repeat the second year and re-register for all outstanding modules. Such student will not be allowed register for any modules in the third year.

(c) A student who has obtained at least 56 but less than 96 second year credits shall repeat the second year, but will be allowed to register for a maximum of 48 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

Third Year to Fourth Year

(a) To proceed to fourth year, a student must pass all first-year modules, and at least 50% of the remaining second year credits. In addition, the student must have passed at least 104 third year credits (75% of the total 140 credits in third year).

Third Year to Fourth Year

(a) Proceed to fourth year, a student must have passed all first-year modules, and at least 50% of the remaining second year credits. In addition, the student must have passed at least 104 third year credits (75% of the total 138 credits in third year).

D.2.2 DEPARTMENT OF FISHERIES AND OCEAN SCIENCES

D.2.2.1 BACHELOR OF SCIENCE IN FISHERIES AND OCEAN SCIENCES (LEVEL 7)

A student advances to the subsequent academic year of study when the following conditions have been met:

First Year to Second Year

(a) At least 83 credits by the end of the First Year (2/3 of total first-year credits).

(b) A student who has obtained at least 59 credits, but less than 82 credits will be allowed to register for a maximum of 55 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) At least 222 credits by the end of the Second Year (all first-year modules plus 92 credits of the second year).

(b) A student who has obtained at least 62 credits but less than 91 credits of year 2, will be allowed to register for a maximum of 60 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

D.2.2.2 BACHELOR OF SCIENCE IN FISHERIES AND OCEAN SCIENCE HONOURS (LEVEL 8) (Phased out)

First Year to Second Year

(a) To proceed to second year, a student must have passed at least 96 credits prescribed in the first year (67% of the total 136 credits first year).

(b) A student who has obtained at least 48 but less than 56 credits by the end of the first year shall not progress second year, but re-register for all outstanding modules in the first year. Such student will not be allowed to register for any modules in the second year.

(c) A student who has obtained at least 56 but less than 96 credits by the end of the first year shall repeat the year, but will be allowed to register for a maximum of 48 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to third year, a student must have passed at least 50% of the remaining first year credits, and at least 112 credits in second year (75% of the total 144 credits in second year).

(b) A student who has obtained at least 48 but less than 56 second year credits by the end of the second shall repeat the year and re-register for all outstanding modules. Such student will not be allowed to register for any modules in the third year.

(c) A student who has obtained at least 56 but less than 112 second credits by the end of second year shall repeat the year, and will be allowed to register for a maximum of 48 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

Third Year to Fourth Year

(a) To proceed to fourth year, a student must pass all first year modules and at least 50% of the remaining second year credits. In addition, the student must have passed at least 104 credits in third year (75% of the total 132 credits in third year).

D.2.3 DEPARTMENT OF FOOD SCIENCE AND SYSTEMS

C.2.3.1 BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY HONOURS

Normal Enrolment

A student advances to the subsequent academic year of study when the following conditions have been met:

First Year to Second Year

(a) At least 71 credits by the end of the First Year (2/3 of total first-year credits).

Second Year to Third Year

(a) At least 186 credits by the end of the Second Year (all first-year modules plus 80 credits of the second year).

Third Year to Fourth Year

(a) At least 289 credits by the end of the Third Year (all first and second year-modules plus, plus 71 credits of the third year).

Fourth Year to Fifth Year

(a) At least 383 credits by the end of the Third Year (all first, second and fourth year-modules plus, plus 58 credits of the fourth year).

Extended Enrolment

A student advances to the subsequent academic year of study when the following conditions have been met:

First Year to Second Year

(a) At least 86 credits by the end of the First Year (2/3 of total first-year credits).

(b) A student who has obtained at least 54 credits, but less than 85 credits will be allowed to register for a maximum of 61 credits in the second year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) At least 223 credits by the end of the Second Year (all first-year modules plus 93 credits of the second year).

(b) A student who has obtained at least 55 credits but less than 92 credits of year 2, will be allowed to register for a maximum of 58 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

Third Year to Fourth Year

(a) At least 343 credits by the end of the Third Year (all first and second year-modules plus, plus 83 credits of the third year).

(b) A student who has obtained at least 57 credits but less than 82 credits of year 3, will be allowed to register for a maximum of 59 credits in the fourth year in addition to the failed modules of the third year provided that the relevant pre-requisites have been passed.

D.2.4 DEPARTMENT OF CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES

D.2.4.1 BACHELOR OF SCIENCE CROP PRODUCTION (LEVEL 7)

A student advances to the subsequent academic year of study when the following conditions have been met:

First Year to Second Year

(a) At least 88 credits by the end of the First Year (2/3 of total first-year credits).

(b) A student who has obtained at least 60 credits, but less than 87 credits will be allowed to register for a maximum of 52 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) At least 224 credits by the end of the Second Year (all first-year modules plus 91 (2/3) credits of the second year).

(b) A student who has obtained at least 60 credits but less than 90 credits of year 2, will be allowed to register for a maximum of 60 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

D.2.4.2 BACHELOR OF SCIENCE IN AGRICULTURE (CROP SCIENCE) HONOURS (Phased out)

First Year to Second Year

(a) To proceed to second year, a student must have passed at least 104 credits prescribed in the first year (67% of the total 152 credits in first year).

(b) A student who has obtained at least 56 but less than 64 credits by the end of the first year shall not progress to second year, but re-register for all outstanding modules. Such student will not be allowed to register for nay modules in the second year.

(c) A student who has obtained at least 64 but less than 104 credits by the end of the first year shall repeat the year, but will be allowed to register for a maximum of 48 credits in the 2nd year in addition to the failed modules provided that the relevant pre-requisites have been passed.

Second Year to Third Year

(a) To proceed to third year, a student must have passed at least 50% of the remaining first year credits, and at least 104 credits in second year (75% of the total 132 credits in second year).

(b) A student who has obtained at least 48 but less than 56 second year credits shall repeat the year and re-register for all outstanding modules. Such student will not be allowed to register for any modules in the third year.

(c) A student who has obtained at least 56 but less than 104 second year credits shall repeat the year, but will be allowed to register for a maximum of 48 credits in the third year in addition to the failed modules of the second year provided that the relevant pre-requisites have been passed.

Third Year to Fourth Year

(a) To proceed to fourth year, a student must pass all first-year modules and at least 50% of the remaining second year credits. In addition, the student must have passed at least 104 third year credits (75% of the total 136 credits in third year).

D.2.4.3 BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING HONOURS

A student advances to the subsequent academic year of study when the following conditions have been met:

First Year to Second Year

At least 121 credits by the end of the First Year of which 78 must be none-core.

Second Year to Third Year

At least 283 credits by the end of the Second Year

Third Year to Fourth Year

All first-year credits and at least 445 total credits

D.3 AWARDING OF DIPLOMAS AND DEGREES

To be awarded a diploma or degree a student shall be required to:

(i) Pass all modules taken in the programme;

(ii) Have completed and passed all field practical training courses.

The diploma or degree Certificate shall be classified in accordance with the provisions of the Academic General Regulations of the University of Namibia.

E. PROGRAMMES OFFERED UNDER THE NEW CURRICULUM

E.1 DIPLOMA PROGRAMMES

E.1.1 DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS

E.1.1.1 DIPLOMA IN LIVESTOCK PRODUCTION (31DLP) – OGONGO CAMPUS

ADMISSION REQUIREMENTS

To be admitted into the Diploma in Livestock Production (level 6), a candidate should have obtained the following grades at NSSCAS/NSSCO level, or equivalents from a recognized qualification:

Subject to School Specific Regulations, the normal basic requirement for entrance to the Diploma in Livestock Production programme shall be:

- A pass in five different subjects as below with the combination of the following subjects including English: Agriculture, Biology, Mathematics, Chemistry, Physics or Physical Science
- 2 subjects on NSSCAS level and obtained a "e" or higher,
- 3 subjects on NSSCO level with a D or higher,
- English must be at minimum D grade on NSSCO level

Admission criteria based on school leaving certificate prior to 2021.
Subject to school special regulation, the normal basic requirement for entrance to Diploma in Livestock Production shall be:
A pass in five different subjects as follows:

(i) On ordinary level (NSSCO) with a minimum of 24 points on the UNAM Evaluation Scale, with English at a minimum D at NSSCO level.

OR

(ii) With a combination of ordinary (NSSCO) and higher (NSSCH) level with a minimum of 24 points on the UNAM Evaluation Scale with English at a minimum D at NSSCO level.

In both (i) and (ii) English must be a minimum of a D symbol at NSSCO level with the following subject combination: Mathematic, Agriculture/Biology, Physics/Chemistry/Physical Science and any other subjects.

PROGRAMME SCHEDULE

Total credits YEAR 1						
Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) /Elective (E)
Year 1 Core semester						
U3403FS	Skills Portfolio	5	0		None	**C**
U3583LA	Academic literacy 1	5	8	L (2 h/week)	None	**C**
U3583AL	Digital Literacy	5	8	L (2 h/week)	None	**C**
F3500ZI	Issues in Agriculture	5	4	L (2 h/week)	None	**C**
F2440BD	Basic Programming with Python	5	4	P (40 h/semester)	None	**C**
Total Credits Core semester						24
Year 1 Semester 1						
F2411BB	Principles of Biology	4	14	L (4h/week) P (3h/week)	None	**C**

F2411CP	Principles of Crop Production	4	14	L (4h/week) P (3h/week)	None	**C**
F2451BE	Basic Economics	4	12	L (4h/week) T (3h/ alt week)	None	**C**
F2431BM	Elementary agricultural mathematics and statistics	4	12	L (4h/week) T (2h/ alt. week)	None	**C**
Total Credits Semester 1						54
Year 1 Semester 2						
F2412BI	Information Systems for Agriculture	4	12	L (4h/week) T (2h/ alt. week)	None	**C**
F2432CO	Olericulture Technology	4	14	L (4h/week)P (3h/week)	None	**C**
F2432BD	Community Development & RuralSociology	4	12	L (4h/week) T (3h/week)	None	**C**
F2402BN	Animal Nutrition and Feeding	4	7	L (4h/week) T (3h/week)	F2411BB Principles of Biology	**C**
F2402TR	Farm Mechanization	4	7	L (2h/week) P (2h/ alt. week)	Elementary agricultural mathematics and statistics F2431BM	**C**
Total Credits Semester 2						50
Total credits YEAR 1						128
Module code	Module name	NQF Level	Credits	Contact hours per week(L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) /Elective (E)
Year 2 Core semester						
U3683LA	Academic Literacy II	6	8	L (2 h/week)	English for special purposes	**C**
U3520LP	Leadership Skills	5	2	L (2 h/week)	None	**C**
U3420CN	National and GlobalCitizenship	4	2	L (2 h/week)	None	**C**
U3420PJ	Project management	5	2	L (2 h/week)	None	**C**
U3520TH	Introduction to Criticalthinking	5	2	L (2 h/week)	None	**C**
F3610ZR	Introduction to Statistical Programmin g with R	6	8	L (2h/week)	None	**C**
Total Credits Core semester						24
Year 2 Semester 1						

F2511BB	Entrepreneurship & Business Development	5	12	L (4h/week) T (3h/week)	None	**C**
F2502BR	Animal Reproduction	5	14	L (4h/week) P (3h/week)	F2411BB Principles of Biology	**C**
F2531BG	Genetics	5	14	L (4h/week) P (3h/week)	F2411BB Principles of Biology	**C**
F3551AA	Animal anatomy & Physiology	5	14	L (4h/week) P (3h/week)	F2411BB Principles of Biology	**C**
Total Credits Semester 1						54
Year 2 Semester 2						
F2552CN	Soil Science	5	14	L (4h/week) P (3h/week)	None	**C**
F2512BB	Applied Animal Breeding	5	14	L (4h/week) P (3h/week)	F2531BG Genetics	**C**
F3512AL	Livestock ProductionSystems	5	14	L (4h/week) P (3h/week)	None	**C**
F2512CQ	Introduction to statistics	5	12	L (4h/week) T (2h/alt. week)	Elementary agricultural mathematics and statistics F2431BM	**C**
Total Credits Semester 2						54
Total credits YEAR 2						132
Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) /Elective (E)
Year 3 Core semester						
W2600BF	Field Attachment	6	16	4 months (extend in semester 1)	None	**C**
F2660BF	Farm Duties	6	8	L (2 h/week		**C**
Total Credits Core semester						24
Year 3 Semester 1						
F2611BE	Extensive Animal Production (Blended)	6	16	L (4h/week) P (3h/week)	F2532BL Livestock Production Systems	**C**
F2631BF	Farm Management (On line)	6	14	L (4h/week) T (3h/ alt. week)		**C**
F2651BR	Rangeland Management (Blended)	6	16	L (4h/week) P	None	**C**

				(3h/week)		
F3601AG	Game Ranching (Blended)	6	8	L (4h/week) P (3h/week)	None	**C**
Total Credits Semester 1						54
Year 3 Semester 2						
F2612BH	Farm Animal Health	6	16	L (4h/week) P (3h/week)	F2551BA Anatomy & Physiology of Farm Animals	**C**
F2632BI	Intensive Animal Production	6	16	L (4h/week) P (3h/week)	F2532BL Livestock Production Systems	**C**
F3612EE	Agricultural Extension & Group dynamics	6	14	L (4h/week) T (2h/week)	None	**C**
F2622BM	Agricultural Marketing & Policy	6	7	L (2h/week) T (2h/ alt. week)	None	**C**
Total Credits Semester 2						55
Total credits YEAR 3						132
TOTAL CREDITS IN THE PROGRAMME						392

MODULE DESCRIPTORS

FIRST YEAR MODULES

U3403FS SKILLS PORTFOLIO

Module Title:	SKILLS PORTFOLIO
Module Code	U3403FS
NQF Level	5
Notional Hours	0
Contact hours	N/A
Additional learning requirements	None
NQF Credits	0
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	None
Semester Offered	1

Module content

UNIT 1: Academic Planning and Goal Setting Individual Needs and Values; Steps in Reaching a Personal Vision; Proactive Approach Towards Learning; Self-Regulated Learning; Personal and Academic Goal Setting; Receptiveness to Learning; Exploring Self Development and Self- Awareness.

UNIT 2: Attitude and Motivation Understanding Motivation; Personal Attitudes, Behaviors and Interests; Self-Reflective Process; Approaches to Dealing with Negative Factors; Class Attendance and Participation; Procrastination; Self-Reliance; Discipline; Accountability; Healthy Habits.

UNIT 3: Learning styles Understanding Personal Approaches to Learning; Dynamics of The Learning Process; Learning Styles and Strategies.

UNIT 4: Study Methods and Skills Study Habits and Strategies; Learning Styles and Techniques; Effective Study Methods and Skills; Note Taking; Memory and Reading Skills; Critical Thinking.
UNIT 5: Time Management Effective Time Management; Planning; Decision-making; Prioritization; Setting Boundaries; Time for Self – care; Procrastination.
UNIT 6: Assessment Preparation In class exercise; Test and Examination preparation; Organizing academic workload; Setting daily study goals; Staying physically active; Study groups.
UNIT 7: Mental well-being Understanding mental health; Signs and indicators of poor mental health; commonly experienced mental health challenges; psychosocial stressors; Seeking professional help; Coping strategies.
UNIT 8: Interpersonal Communication Effective Communication Skills; Verbal and Non-Verbal Communication; Listening Skills; Problem Solving; Assertiveness; Negotiation Skills; Practicing Empathy in Communication; Self-Confidence; Receptiveness to Feedback; Building Trust; Teamwork; Leadership; Public Speaking Skills.
UNIT 9: Financial matters and management Financial Literacy; Budgeting; Available Finance Options and Assistance; Managing Financial Resources.
UNIT 10: Student Violence Types of Violence; Individual Roles in Violence; Myths, Forms; Consequences of Violence; Prevention Measures; Seeking for Help. UNIT 11: Career Planning and Development Defining and Selecting Career Goals; Career Exploring Different Strategies; Soft Skills Training.
Learning and Teaching Strategies/Activities

Student Assessment Strategies
100% continuous assessment
Reflective journal on each unit (portfolio)

U3583LA ACADEMIC LITERACY 1

Module Title:	**ACADEMIC LITERACY 1**
Module Code	U3583LA
NQF Level	5
Notional Hours	180
Contact hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	0, 1 & 2

Module content:
The module will cover study skills, reading (including extensive reading), listening, speaking, writing, referencing, and language usage and text organisation.
Learning and Teaching methods:
The course will be facilitated through, but not limited to, the following learning activities:
- Blended instruction: Face-to-face and online
- Tests and assignments
- Tutorials/ Academic support
- Presentations

Student Assessment
Assessment will be based on Continuous Assessment.
Learning and teaching enhancement strategies
Students shall be exposed to library user-based services and training.
- Students that might experience performance difficulty in the module will be identified and the necessary support and guidance as an intervention strategy will be provided by the teaching staff.
- Statistics of the module pass and failure rate will be continuously monitored.
- Student-lecturer evaluation
- Lecturer-peer evaluation
- Curriculum review
- **Moderation of assessment tools**

U3583DD DIGITAL LITERACY

Module Title:	**DIGITAL LITERACY**
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content

Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites

Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time

Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues

Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia

Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings

Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks

Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog)

Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Learning and Teaching Strategies/Activities

Lectures: presentation on concepts and other theoretical foundations of Digital Literacy

Discussion forums: reflecting on own contexts and sharing perspectives

Collaborative learning: group learning and activities carried as part of projects

Inquiry: carrying out of research to explore and understand scenarios and problems

Projects: carry out projects on digital literacy

Presentations and demonstrations: presentation of outcomes of projects (products, processes, impact)

Portfolio writing: writing reflective learning journals related to digital literacy

Student Assessment Strategies 1. Collaborative assessment tasks

1.1 Digital productivity: *cloud based collaborative digital media creation using cloud platforms*

1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing

Individual assessment tasks

2.1 Assignment: information literacy assignment

2.2 Test x 2

Practical

3.1 Digital proficiency

3.2 Data and Media literacy

No written examination

Learning and Teaching Enhancement Strategies

Student feedback: feedback from students using focused feedback instruments

Peer feedback: student feedback on peer evaluation of each other's collaboration, participation and contribution

Self-evaluation: quizzes and students' reflective journal/ portfolio on their own learning

Learning analytics: use of learning management tools on student participation and online learning activities, and analyse assessment performance

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F2440BD BASIC PROGRAMMING WITH PYTHON

Module Title:	**BASIC PROGRAMMING WITH PYTHON**
Module Code	F2440BD
NQF Level	5
Notional Hours	50
Contact hours	4 hours lectures per week for 5 weeks
Additional learning requirements	P (40 h/semester)
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 0

Module Content

Python installation**; The python interpreter; Language semantics.** Data Structures and their operations**; Variables; Strings; numeric variables and their different subtypes; Tuples; Lists; Dictionaries; Sets.** Control Flow**; if, else and elif**

statements, for loops; while loops; exception handling. Functions**; returns in Python; Basic functions; Numpy modules; Numpy Arrays.** Classes**: phenomenological approach to classes;** Interaction with OS**; Reading and Writing files, importing data with Numpy; scripting.** Data Visualization**; Introduction to Matplotlib; histograms; line and scatter plots.** Pandas**; Introduction to the Pandas data frames.** Introduction to Jupyter Notebooks.

Learning and Teaching Strategies/Activities

1. Lectures: these will be carried out via face to face and online mode (blended method).
2. Tutorials: Students will do guided practical problems. These will summarize the process from raw to final presentable results.

Student Assessment Strategies

Student assessment will be based on formative assessment only through 100% continuous assessment. The assessment comprises of 2 practical tests (60%) and 2 individual assignments (40%). A minimum mark of 50% needs to be achieved in order to pass the module

F3500ZI ISSUES IN AGRICULTURE

Module Title:	**ISSUES IN AGRICULTURE**
Module Code	F3500ZI
NQF Level	5
Notional Hours	40
Contact hours	20 Contact hours
Additional learning requirements	Field trips, Seminars and guest lectures
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module content

Agriculture: Agriculture as important economic sector; Population dependence on agriculture for their livelihoods. Production systems: Production systems and production sustainability. Land tenure systems: freehold and customary tenure. Agricultural Opportunities and Restrictions: such as the veterinary cordon fence; financial collateral; and the greed in the commons. The Namibian market driven economy and agricultural contribution: Agricultural practices; Resilience of livelihoods to withstand challenges posed by climate change; land scarcity, water; drought management relation to climate change; Cause and consequences of the supply chain of agricultural sub-sectors. Overview of sub-sectors and their value chains: cattle; sheep and goats; pigs; dairy; poultry; agronomy; horticulture; game and bio-mass. Niche markets: such as Swakara and Ethical issues of Genetically Modified Organisms (GMO's) and implications to food production systems; use of examples to demonstrate how a society use result into different externalities to balance policy intervention.
Learning and Teaching strategies/Activities
Face-to-face lectures and/or online lectures/activities (pre-recorded or real-time)
Face-to-face or online tutorials.
Self-study tasks and assignments
Student Assessment strategies
Continuous assessment (100% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
A final mark of 50% is required to pass this course

YEAR ONE, SEMESTER ONE

F2411BB PRINCIPLES OF BIOLOGY

Module Title:	PRINCIPLES OF BIOLOGY
Module Code	F2411BB
NQF Level	4
Notional Hours	140 3 Lecture hours / week for one semester; 3 Practical hours alternate week for one semester.
Additional learning requirements	None
NQF Credits	14
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester One

Module Content

Introduction: Definition, branches, applications; scientific approach; Taxonomy: Basic taxonomy and classification; overview of the three domains and six kingdoms of organisms; Cellular structure and processes: Prokaryotic and eukaryotic cells; ultrastructure of plant and animal cells and their function; process of photosynthesis; Reproduction: Binnary fission in bacteria; sexual and asexual reproduction in algae and fungi; basic reproductive cycles in livestock;

Growth & Development: Growth and development in plants and animals; Introduction to Ecology: Biogeochemical cycles; environmental pollution (noise, air, water, radiation, soil); global warming and the greenhouse effect; Introduction to entomology: Overview of the important biological vectors and pests of plants and animals

Learning and Teaching Strategies/Activities

This module will be offered as a blended on-line and face-to-face mode and learning will be carried out through the following teaching methods: -

1. Lectures and group discussions
2. Practical sessions: students will be given opportunity to acquire skills via practical which will enhance application of knowledge learned and problem solving to practical aspects of biology.
3. Group discussions: students will carry out some tasks in groups to facilitate acquisition of soft skills such as communication and teamwork. WhatsApp platforms may be used as well.

Student Assessment Strategies

Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (2 tests [50%], at least 4 assessed practicals and quizzes [40%] and at least 1 assignment [10%]) and a summative assessment (end of semester examination) 50% (1x 2 hours theory paper). Pass mark for the module is 50%.

F2411CP PRINCIPLES OF CROP PRODUCTION

Module Title:	**PRINCIPLES OF CROP PRODUCTION**
Module Code	F2411CP
NQF Level	4
Notional Hours	140
Contact hours	03 Lecture hours per week per semester; 03 Practicals hours per Alternate week per semester
Additional learning requirements	Field Trips, Term Project
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Crop environment in Namibia. Environmental factors affecting crop choice: temperature, rainfall, solar radiation, photoperiodism. Sustainable crop production and resource use efficiency: Principle of Sustainability; Concepts of Sustainable Crop Production. Cropping systems, tillage and crop establishment. Modern concept of tillage. Climate resilient agriculture and Crop diversification. Fertilization and management practices. Time of planting: Pre- and post-rain planting. Land preparation: Aims; Tillage systems – conventional, minimum, conservation tillage; Cultivation equipment. Seeding: Factors affecting seed quality; Seeding depth; Seeding rate; Plant population. Fertilizer application times, methods and fertilizer rates. Calculation of row and intra-row spacing. Cropping systems: Monoculture; Mixed culture; Intercropping production potential and mechanism, and yield advantage.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2451BE BASIC ECONOMICS

Module Title:	BASIC ECONOMICS
Module Code	F2451BE
NQF Level	4
National Hours	120
Contact hours	3 Lecture / Week; 2 hours alternate tutorial / week for 12 weeks
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:

The course will cover topics such as Basic Concepts of Economic: Fundamentals principles of Economics, the economic system; Demand and Supply: Law of demand and supply, determinants of demand and supply of agricultural commodities, market equilibrium, market regulations and price control; Theory of Production: Production function and law of production; Cost Theory: cost concepts, short-run and long-run costs; budget line/constraints, least

cost combination and profit maximization; Theory of consumer behavior: basis of choice-Utility, budget constraint, equilibrium; Theory of firm: monopoly, perfect competition, monopolistic competition, oligopoly; Risk and Uncertainty: Types of risk, sources of risk and uncertainty and risk management; National Income Accounting: importance of national income accounting, measuring GDP, inflation; Consumptions, Savings and Investment and economic growth. Business cycles and Unemployment: phases of business cycle; unemployment, and inflation; Money and Banking: characteristics, types and functions of money, quantity theory of money, banking and the concept of interest, monetary policies; Public funding and Expenditure: Taxation and Budget and Fiscal policies; International Trade: comparative and absolute advantage, exchange rates and terms of trade. The role of agriculture in the economy of Namibia.

Student Assessment Strategies

Continuous Assessment 50%: minimum of 2 Tests and 2 assignments.
Examination 50% (2 hours)
To pass this module a student should obtain a minimum final mark of 50%.

F2431BM ELEMENTARY AGRICULTURAL MATHEMATICS AND STATISTICS

Module Title:	**ELEMENTARY AGRICULTURAL MATHEMATICS AND STATISTICS**
Module Code	F2431BM
NQF Level	4
Notional Hours	120
Contact hours	4 hours lectures per week 2-hour tutorial sessions alternate week for a semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)/	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Numbers; Operations; Percentages; Conversion of fractions and decimals; Ratio; Rate; Proportion and scale; Algebraic representation and formulae; Equations; Indices; Measurements and conversion of units; Geometrical terms and relationships; Bearings; Tables and graphs in practical situations; Trigonometry; Basic statistics: Population and sampling; Probability sampling methods; Measures of central tendencies; Measures of dispersion: Frequency distribution (grouped and ungrouped) data; Probabilities; Regression and correlation;

Student Assessment Strategies

Continuous assessment (at least two tests; four tutorial tests and two assignments) 60% Examination 40% (1x2 hour Examination paper).

1. Belinda Huntley and Anne Love: Elementary Tertiary Mathematics with Geometry (2nd Ed.)

YEAR ONE, SEMESTER TWO

F2412BI INFORMATION SYSTEMS FOR AGRICULTURE

Module Title:	**INFORMATION SYSTEMS FOR AGRICULTURE**
Module Code	F2412BI
NQF Level	4
Notional Hours	120
Contact hours	3 Lectures / week and 2 hours tutorials every alternate week
Additional Learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:

Introduction to agricultural information systems: main concepts and definitions; types and components of Information system; categories of agricultural information; Scope, importance and needs of Information systems; model of agricultural information systems. Agricultural Knowledge and Information system (AKIS): The key concepts of an Agricultural Knowledge and Information system (AKIS); Key actors in AKIS; Users and flow of agricultural Information; Barriers to proper flow of agricultural information. Sources of agricultural information: Databases; Government Institutions; Agricultural Censuses such as Namibia Statistical Agency agricultural censuses and surveys, design and implementation of agricultural surveys, types of survey and strategies for survey implementation; International Agencies (FAO-STAT, World Bank, UNDP etc); Deficiencies in the current databases. Agricultural Information systems in

Namibia: Early warning systems and other information management systems such as Food insecurity and vulnerability information mapping system (FIVIMS). The Data preparation, its importance and processing: - Data editing, coding, checking and storage of data; communicating of agricultural information; tools for agricultural information systems. Interactive computing: Exposure to various computer packages; Use and analysis of agricultural information; Information gaps and how to extrapolate missing information and the data presentation.

Student Assessment Strategies

1. Summative assessments 100% which constitute a minimum of 5 continuous assessments which includes tests, quizzes and practical assessments
2. No Final exam
3 Effective and efficient supervision and monitoring assignments, tests and other assessments
4 To pass this module a student should obtain a minimum final mark of 50%.

F2432CO OLERICULTURE TECHNOLOGY

Module Title:	**OLERICULTURE TECHNOLOGY**
Module Code	F2432CO
NQF Level	4
Notional Hours	140
Contact hours	4 hours lectures per week per semester, 3 hours practical alternate week per semester
Additional learning	Excursions (visits to relevant farms for exposure) field attachments and group projects on campus.
NQF Credits	14
(**Co-requisites)**	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Horticulture: branches of horticulture; types of horticultural production. Vegetable classification systems: botanical; pollination; growth season; optimum growth temperature; cold/heat sensitivity; edible plant part. Importance of vegetables: economic and human nutrition importance. Cropping systems: shifting cultivation; continuous cropping; crop rotation; sole cropping and mixed cropping. Cultural practices: hardening/ acclimatization; mulching; thinning; pruning; training; earthing-up; phase planting. Good agricultural practices (GAP): scouting; hygiene; record keeping; pollution management; pre-harvest interval; field vegetable holding shed. Types of vegetables: leafy; root; fruit; legume; runner; exotic/indigenous vegetables. Mushrooms: spawn production; vegetative growth and requirements; fruit body formation and requirements. Production requirements/ practices: environmental requirements; selection of suitable cultivars; vegetable nursery practices; management practices; seed dormancy. Crop protection: methods of weeding; pest and disease control. Harvesting: harvesting indicators; harvesting methods and post-harvest handling. Marketing: Good harvest and post- harvest practices; marketing strategy; selling channels; price and quality.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports, and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2432BD COMMUNITY DEVELOPMENT AND RURAL SOCIOLOGY

Module Title:	COMMUNITY DEVELOPMENT AND RURAL SOCIOLOGY
Module Code	F2432BD
NQF Level	4
Notional Hours	120
Contact hours	3 hours Lectures / Week; 2 hours tutorial every alternate week for a semester
Additional learning requirements	Group work and projects
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Basic sociological concepts: introduce sociological concepts and their application to agriculture and rural development planning; Importance of Rural Sociology: the significance of rural sociology to agricultural extension community and rural development; Rural and Urban Populations: differences between rural and urban population;

rural/urban migration culture and culture change: social interaction and social structures; groups and organization, deviance, social class and stratification; Social institutions: families; religions; social change in global perspective. Poverty and development: Poverty and wellbeing, understanding the socio-economic context of development, Community development: concept of community development, principles of community development, and ways to –coordinate community development, community development methodologies and approaches, mobilizing resources for community interventions.

Student Assessment strategies

1. Continuous 60% (2 Tests (30%), Presentations (10%), Assignments (10%).
2. Examination 40% (1X 2 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F2402BN ANIMAL NUTRITION AND FEEDING

Module Title:	**ANIMAL NUTRITION AND FEEDING**
Module Code	F2402BN
NQF Level	4
Notional Hours	70
Contact hours	3 Lecture hours / week for 12 weeks; 3 Practical hours / week for one semester
NQF Credits	7
(Co-requisites)	
Prerequisite	Principles of Biology
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:

Introduction: Basic animal nutrition concepts and terminologies; The role of animal nutrition in animal production. Components of animal feeds: Chemical composition of feeds; Basic feed nutrients (Carbohydrates, lipids, protein, vitamin, micro and macro minerals and water) and Anti-nutritional factors (ANF's) - tannins, gossypol, trypsin inhibitors, saponins; effects in animals, reduction of ANF's. Laboratory analysis of feeds: Proximate analysis; Detergent fibre analysis; Near infrared Reflectance Spectroscopy (NIRS). Animal feed classification: Feeds and feedstuff classifications: (roughage, concentrates, supplements, feed additives); General comparison of plants and animal feeds as feed sources with special focus on nutritive values, availability, affordability and feed laws. Fodder conservation & improvement: Hay & silage making; Improvement of low-quality roughages – chemical & physical treatments. Nutrient digestion in animals: Monogastric digestion (poultry, pigs); Non-ruminant herbivores digestion (horses & donkeys); Ruminant herbivore digestion (cattle, goats and sheep). Digestibility techniques: *In vivo* & *in sacco* methods of feed digestibility; *In vitro* digestibility. Feed energy and protein partitioning: Metabolisable energy system (ME); Metabolisable protein system (MP). Mineral and vitamin nutrition: Macro-minerals function, deficiency symptoms, sources; Vitamins function, deficiency symptoms, sources. Nutritional/Metabolic disorders: Milk fever, acidosis, bloat, laminitis, ketosis, Hypomagnesemia; Causes, symptoms, treatment, prevention. Feed formulation and feed mixing: Nutrient requirement of farm animals for maintenance, growth, reproduction and other functions; Significance and uses of feeding standards; Feed formulation methods – Pearson Square Method, Computer aided methods;

Student Assessment

1. Continuous Assessment 60% which will be composed of 2 Tests; 2 assignments and 3 marked practicals.
2. Examination 40% (1 x 2 hours paper)
3. To pass this module a student should obtain a minimum final mark of 50%.

F2402TR FARM MECHANIZATIONS

Module Title	**FARM MECHANIZATIONS**
Module Code:	F2402TR
NQF Level	4
Notional hours	70
Contact Hours	4 Lecture hours / week / semester; 3 Practical hours / week for one semester
Additional learning requirements	Field trips / Excursions, Group work
NQF Credits	7
(Co-requisites)	
Prerequisite	Elementary agricultural mathematics and statistics, Introduction to Statistics
Compulsory/Elective	Compulsory
Semester offered	2

Module content

Farmstead planning: Plans and drawings. Building procedures and equipment. Structures for specific purposes: farmstead, livestock, crop storage, greenhouses. Building economics and standards: Construction materials. bills of quantities. Fundamentals of Engineering: Fundamental quantities and units; Concepts of work; Power and Torque. Farm Power sources: Animal Power; electricity; Natural Power wind energy; solar energy. Animal Power: Hitching; capability; training. Machine Power: The Tractor; The internal combustion engine and other sub-systems; Power Trains: Tractor tests and Performance; Operation and maintenance; Safety. Tillage: Primary tillage; secondary tillage; conservation tillage; implement types and their operation. Crop planting, fertilization and weed control: Equipment

types and operation; calibration and safety aspects. Crop Harvesting: Objective, equipment types, operation and maintenance; combine harvester-types and operation. Farm Machinery Management: Machine capacity, performance and costs; Machinery cost and selection.

B.3.2 SECOND YEAR

U3683LA ACADEMIC LITERACY II

Module Title:	**ACADEMIC LITERACY II**
Module Code	U3683LA
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact Hours	Semester 0: 4 hours/week Semester 2: 2 hours/week
Prerequisite	Academic Literacy I
Compulsory/Elective	Compulsory
Semester Offered	Core Semester,1&2
Module Purpose	

Module content

The module is designed for students enrolled in a bachelor's degree, which requires them to do basic research, read and listen to specific academic material, produce specific written texts and give academic presentations. The module thus, focuses on enhancing academic reading, academic vocabulary, writing, listening and speaking.

Student assessment strategies
The module will be continuous assessment based.
Assessment will include written tests, individual and group assignments, portfolio assessments and oral presentations.
Learning and teaching enhancement strategies
Weekly task completion monitoring

- Student-lecturer evaluation
- Lecturer peer-review
- Moderation of assessment tools
- Curriculum review

U3520LP LEADERSHIP SKILLS

Module Title:	LEADERSHIP SKILLS
Module Code	U3520LP
NQF Level	5
Notional Hours	20
Contact hours	1 x 2h per week for 6 weeks
Mode of Delivery	Blended: Face to face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2
Scheduled Review Date	TBC

Module Content

Definition and scope of leadership; History and origins of leadership; Types of leadership; Leadership versus management skills; Leader (master of self, effective manager of people, active visionary); manager; Not all leaders are managers; Not all managers are leaders; Authority versus leadership; Power versus leadership; Principles of leadership (ability, adaptive, action, empowerment, creativity, problem solving, shared); Are leaders born or made?; Characteristics of a good leader; Functions of leaders in organizations; Leading for the future; Mentoring skills; The 21st century leader; Ethical leadership skills; Responsible leadership skills.

Student Assessment Strategies
The module will be assessed using 100% continuous assessment.

Learning and Teaching Enhancement Strategies

U3420CN NATIONAL AND GLOBAL CITIZENSHIP

Module Title:	**NATIONAL AND GLOBAL CITIZENSHIP**
Module Code	U3420CN
NQF Level	4

Notional Hours	20
Contact hours	Up to 1 contact lecture periods per week for 6 Weeks
Mode of Delivery	Blended: Face to face and Online
Additional learning requirements	Each student will be required to work on a personal project which will include a site visit
NQF Credits	2
(Co-requisites)	
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	Core Semester
Module Content	

UNIT 1: Constitution and its Importance
What is a constitution; Functions of a constitution; What it contains; Constitution and democracy
UNIT 2: Global Citizenship
The meaning of global citizenship; Importance of global awareness; World issues of concern to global citizens.
UNIT 3: Civic Engagement
What do we mean by civic engagement; Dimensions of civic engagement; Indicators of civic engagement; Promoting civic engagement.
UNIT 4: Globalization
Understanding globalization; Cultural construction of neoliberal globalization; Major players; Major domains; Major Issues; Futures of Globalization
UNIT 5: Intercultural Communication
Dealing with difference; Levels of culture; Stereotypes and generalizations; Intercultural communication Processes
UNIT 6: Sustainable Development Goals and individual action
Introduction to SDGs; Contributing to achievement of SDGs through action
Learning and Teaching Strategies/Activities

Student learning in this module will be supported by provision of subject knowledge; engaging students in class discussions, and individual awareness and action portfolios. It will expose students to real life situation through formal lectures, guest lectures, experiential activities such as engaging local civic organizations; Students will engage in active and participatory learning in which they generate ideas and share their knowledge on a topic. Material will include journal articles, videos, PowerPoint presentations, as well as handouts for students' reflection.

Student Assessment Strategies

Continuous assessment of 100% - Assessment will be done by completing online pop-up quizzes; and developing their online portfolios of personal action as response to tasks assigned in class.

U3420PJ PROJECT MANAGEMENT SKILLS

Module Title:	**PROJECT MANAGEMENT SKILLS**
Module Code	U3420PJ
NQF Level	5
Notional Hours	20
Contact hours	2 hour lecture per week for the first two week and field-based practical for the remaining four weeks.
Mode of Delivery Blended:	face-to-face and online
Additional learning requirements	The field-based practical to be undertaken in the immediate environment of the student
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2
Module Content	

This module consist of two components: *The first component* is a two week theory covering the concepts (project vs programme) and the phases of project life cycle (project initiation and planning: work breakdown, development of SMART indicators, estimation of activity duration, efforts, and costs, scheduling of activities, identification of critical path, setting of milestones, stakeholder identification and categorization, stakeholder engagement, initial risk identification, and development of the initial project plan; project implementation & management: forming the project team, managing people, resources allocation, responsibilities allocation, quality assurance, leadership style and project liaison; project monitoring and control: progress reporting and communication, quality control, time management, budget and cost management, risk management and mitigation; project closure and evaluation: project evaluation, project auditing process and the closure process, and final project report). *The second component* is a four week field-based practical where students participate in a real-life project in their immediate environment. Students are strictly required to apply the project management approach during the field-based practical.

Student Assessment Strategies

Student assessment will be 100% continuous assessment based on weekly project progress reports (50%) and the final project report (50%). A minimum pass mark for the module is 50%.

U3520TH	INTRODUCTION TO CRITICAL THINKING
Module Title:	INTRODUCTION TO CRITICAL THINKING
Module Code	U3520TH
NQF Level	5
Notional Hours	20 notional hours
Contact hours	1 hour practical session per week interfaced with limited online engagement
Mode of Delivery	Blended: Face to face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content

The module will cover: Definition of critical thinking: striving for understanding; to have an inquisitive yet open-minded and flexible approach to exploring ideas, the ability to evaluate information and draw clear conclusions based on the evidence at hand. Core critical thinking skills: explain, infer, analyse, evaluate, problem solving, self-reflect. deductive and inductive reasoning: inductive reasoning- move from the specific to the general, deductive reasoning- moving from the general to specific. Construction of argument: construct statements that combine reasoning with evidence to support an assertion or argument. Problem analysis: define problem, determine the root causes of problem, develop alternative solutions to problem, implement solution, evaluate outcome. Reflective learning: asking open questions, reflect on answers, writing reflective learning essays, thinking about other's answers, asking 'why" questions. Understanding fallacies: what is a fallacy? description of various fallacies, identifying a fallacy in an argument, explaining a fallacy to an opponent in an argument.

Student Assessment Strategies

100% Continuous assessment (1 reflective learning essay, 1 problem solving activity).

F3610ZR	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Title:	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Code	F3610ZR
NQF Level	6
Notional Hours	80
Contact hours	4 lecture periods per week and one 3hour practical per week for semester core
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Core Semester
Module Content	

Learn how to navigate RStudio: how to load/save a file; load a package; access help. Examine the base R objects: vectors; matrices, arrays, lists, factors and tables; their respective characteristics, naming conventions and structures. Understand sub-setting, filtering and creation of these objects. Examine the implementation of control structures (loops and functions) in R. Investigate how R can be used for mathematical and statistical calculations. Data Cleaning and Manipulation in R: Lear how to manipulate and clean data in R; importing and exporting data from other statistical packages and data bases; aggregating data; reshaping data Visualisation (Packages): Learn how basic plots are generated in R – histograms; X-Y plots, bar charts; pie charts, scatter plot. Understand the ggplot2 package for advanced plotting; Statistical Testing: Understand how R can be for hypothesis testing. Investigate how R can be used in statistical modelling techniques (SLR)

Student Assessment Strategies

Continuous Assessment: 100 % (minimum of 2 tests (30%), 1 project assignment (presented in oral and written form, 40%), 3 marked practicals, 30%). The pass mark for the module is 50%

F2511BB	ENTREPRENEURSHIP AND BUSINESS DEVELOPMENT
Module Title:	ENTREPRENEURSHIP AND BUSINESS DEVELOPMENT
Module Code	F2511BB
NQF Level	5
Notional Hours	140
Contact hours	3 Lectures + Reflective Practices / Week for one semester

Additional learning requirements	Field Trips, guest lectures, case studies
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Content	

Theory of entrepreneurship: meaning, importance of entrepreneurship, concepts, characteristics, classifications of entrepreneurship, problems faced by entrepreneurs in Namibia, entrepreneurial process: critical factors for starting a new enterprise, evaluating opportunities for new businesses, determining resource needs and acquiring resources; business model canvass: the revenue model, the cost model, formulating a winning strategy, the people are what matters- entry strategy- growth strategy; entrepreneurial marketing: marketing considerations- selecting the target market, market strategy. pricing strategies and marketing of services, export marketing; financing entrepreneurial ventures: sources of finance: debt and equity; entrepreneurial growth: transition from start-up to growth, the growth process and execution; intellectual property rights by understanding the mandates of BIPA; copyrights, trademarks, trade secrets, patents, licensing; business planning process under Namibian regulations; planning process, business plan; accounting for agri-business enterprises; basic financial statements, managing cash flows, preparation of projected financial statements, applications of business ratios, small business management as well as strategies that improve performance of new business ventures; production and material, human resources, finance management, break even analysis, operational cycle.

Student Assessment Strategies

The student assessment will comprise of Individual assignments, Tests, Quizzes, and Examination.
Exams: There will be a written final examination consisting of essay questions.
Test: the students write tests to assess theirs understanding of teaching and learning materials.
Quizzes: There will be short unannounced quizzes with questions related to the day's assigned reading and prior class sessions.
Assignments: There will be several assignments for the student to apply the concepts learned. The expectation is that assignments be completed individually.
The grade in this module will be comprised of the following elements

1. Continuous 60% (2 Tests (25%), assignments (15%).
2. Examination 40% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F2502BR ANIMAL REPRODUCTION

Module Title:	ANIMAL REPRODUCTION
Module Code	F2502BR
NQF Level	5
Notional Hours	140
Contact hours	4 Lecture hours / week; 3 Practical hours alternate week for one semester
Additional learning requirements	Excursions
NQF Credits	14
(Co-requisites)	
Prerequisite	Principles of Biology
Compulsory/Elective	Compulsory
Semester Offered	Semester Two
Module Content	

Introduction: overview of livestock industry and the importance of reproductive efficiency; definition of important terms such as estrus, gametes, embryo, fetus and placenta; Anatomy and Physiology: comparative anatomy and physiology of the male and female reproductive systems of domestic animals; Endocrinology of reproduction; factors that regulate reproduction; hormonal control; seasonality; puberty; estrous cycle and signs of heat in livestock; oogenesis, folliculogenesis, ovulation, spermatogenesis; sexual behaviour; Pregnancy & Parturition: Factors affecting conception and fertilization; corpus luteum (CL), capacitation; fertilization; maternal recognition of pregnancy; embryonic and fetal development, sexual differentiation; placentation; endocrinology of pregnancy; and parturition; lactation; Biotechnologies in animal reproduction: artificial insemination (AI); multiple ovulation and embryo transfer (MOET); estrus synchronization; in vitro fertilization (IVF); advantages and disadvantages of the different biotechnologies; Detecting reproductive problems and improving reproductive efficiency: use of records; pregnancy diagnosis; management procedures to improve herd reproductive efficiency; introduction to obstetrics in livestock.

Student Assessment Strategies

Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (2 tests [40%], at least 4 assessed practicals and quizzes [50%] and at least 1 assignment [10%]) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

F2531BG GENETICS

Module Title:	GENETICS
Module Code	F2531BG
NQF Level	5
Notional Hours	140
Contact hours	3 Lecture hours / week for 12 weeks; 3 Practical hours / week for one semester
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	Principles of Biology
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content

This module introduces and presents principles used in the study of genetics. The emphasis is on application of concepts to solve problems. The specific topics to be covered are:
Hereditary material: DNA, genes, chromosomes, genomes, chromosome theory of inheritance, Physical structure of chromosomes, genetic linkage and sex linkages, Mendelian genetics: Mendel's laws of inheritance; Monohybrid and dihybrid crosses, genotypes and phenotypes, punnett square, complete dominance, homozygous and heterozygous. Introduction to extensions of mendelian analysis: Multiple alleles, Incomplete dominance, co-dominance, multiple allelism, gene interaction and contribution of genes and the environment to the phenotype using examples. Cell division: Mitosis and meiosis, cross-over, recombination.
DNA replication in prokaryotes and eukaryotes.
Gene expression: Transcription, Translation and the Genetic Code
Mutations: Types and causes, Aneuploidy and non-disjunction.
Introduction to genetic engineering (GE): GMOs, advantages and disadvantages of GE technology.

Student Assessment Strategies

Continuous Assessment: 60% (2 tests, at least 3 marked practicals, quizzes / assignment)
Exam: 40% (1 x3 hours paper).

F3551AA ANIMAL ANATOMY & PHYSIOLOGY

Module Title:	ANIMAL ANATOMY & PHYSIOLOGY
Module Code	F3551AA
NQF Level	5
Notional Hours	140
Contact hours	4 hours' lecture periods per week and 3 hours practical every week for one semester
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	Principles of Biology
Compulsory/Elective	Compulsory
Semester Offered	Semester one

Module Content

Overview of the important anatomical structures and function of the following body systems in ruminants and monogastrics: Circulatory & Lymphatic System; Respiratory System; Digestive System; Urinary System; Nervous System; Integumentary, Muscular and Skeletal System; Endocrine System; Reproductive System. Other topics: carcass dissections (cattle, sheep, goats, poultry); examination of internal organs in dead animals; study of laboratory models of farm animals;

Student Assessment Strategies

Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 60% of the module grade (i.e., 2 tests, at least 5 assessed practicals, at least 1 assignment and quizzes) and a summative assessment (end of semester examination) 40% (1x 3 hours theory paper). Pass mark for the module is 50%.

YEAR TWO, SEMESTER TWO

F2552CN SOIL SCIENCE

Module Title:	SOIL SCIENCE
Module Code	F2552CN
NQF Level	5
Notional Hours	140
Contact hours	4 Lecture hours/Week per semester 3 Practical hours per semester
Additional learning requirements	Field trips /excursions and group work
NQF Credits	14
(Co-requisites)	

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Content	

Origin and development of soil. General physical properties of soil: weathering and soil formation processes; the soil profile differentiation and morphology; soil phases; volume and mass relationships of soil constituents; soil texture; soil structure. Soil water: movement and availability. atmosphere and temperature. General chemical properties of soil: soil mineralogy; ion exchange; pH; buffer action; alkalinity; soil acidification and salinisation of soil. Soil fertility and fertilization: nutrient content; nutrient availability; organic and inorganic; fertilizer types; fertilizers formulation and calculations, fertilizers applications. Practical work: Laboratory evaluation of simple soil characteristics; Field practicals on soil formation in some areas Namibia.

Student Assessment Strategies

Continuous Assessment: 60 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 40% (01 x 03 hours paper).

F2512BB APPLIED ANIMAL BREEDING

Module Title:	APPLIED ANIMAL BREEDING
Module Code	F2512BB
NQF Level	5
Notional Hours	160
Contact hours	4 Lecture hours per week for 12 weeks; 3 Practical hours per week alternating for one semester
This proposed formulation is intended to take care of blended / online teaching and provide flexibility.	
Additional learning requirements	Excursions; group work
NQF Credits	16
(Co-requisites)	
Prerequisite	Genetics
Compulsory/Elective	Compulsory
Semester Offered	2
Module Content	

The gene: principles of Mendelian Genetics; determinants of the phenotype; additive gene action; dominance; epistasis; sex limited traits; sex influenced traits; sex linked traits
Genes in populations: gene, genotype and phenotype frequency; Hardy-Weinberg Law; forces that change gene frequency
Simply inherited and polygenic traits: number of genes influencing the traits and the influence of the environment
Selection for simply inherited traits: change of gene frequency with continued selection; application of Hardy-Weinberg law
Measures of association: correlation; regression
Heritability and repeatability: definitions; breeding value estimation; prediction of response to selection; selection accuracy; relevance of heritability and repeatability.
Selection for quantitative traits: Expected progeny differences (EPDs)
Multiple trait selection: tandem; independent culling levels; selection of extremes; selection index
Inbreeding: effects; computation.
Outbreeding: phenotypic effects; heterosis; complementarity; types of heterosis
Broad categories of commercial breeding programs: commercial strait breeding; rotational crossbreeding; terminal sire systems; combination systems; composites
Beef cattle improvement: bio-economic traits; record keeping; stud and commercial breeding
Dairy cattle improvement: bio-economic traits; record keeping
Small stock and Poultry improvements: bio-economic traits; record keeping; stud and commercial breeding
Animal reproduction: Heat detection in cattle and small stock; mating and mating seasons
Biotechnologies in animal reproduction: artificial insemination (AI); multiple ovulation and embryo transfer (MOET); estrus synchronization; in vitro fertilization (IVF).
Detecting reproductive problems and improving reproductive efficiency: use of records; pregnancy diagnosis; management procedures to improve herd reproductive efficiency.

Student Assessment Strategies
Continuous assessment constitutes 60% which will be composed of 2 Tests; 2 assignments/ at least 3 marked practicals or tutorials.
Examination 40% (1 X 3 hours)

F3512AL LIVESTOCK PRODUCTION SYSTEMS

Module Title:	**LIVESTOCK PRODUCTION SYSTEMS**
Module Code	F3512AL
NQF Level	5
Notional Hours	140
Contact hours	3 hour Lectures / week for a semester; 3 Practical hours per week for a semester

Additional learning requirements	Minimum of one (1) excursion (outside the normal practicals)
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2
Module Content	

Impact of livestock production on the environment; Structural changes and their impact: Problems associated with animal production and how they; Contribution of livestock to sustainable agricultural development. Global perspectives and the livestock industry in Namibia: Contribution of livestock sector to the Namibian economy; Factors contributing to Namibia's competitiveness in the global export market for meat and other animal products; Marketing of livestock in Namibia; The livestock industry: global perspectives. Systems of production: Classification criteria for production systems; Cattle production systems; Improved systems versus traditional systems; Main environmental problems associated with intensive production systems; Intensive versus extensive systems; Systems of beef production; Livestock management facilities; Basic rules to maintain good housing in relation to health, behavior and welfare; Design considerations for farm buildings. Adaptive and productive components of productivity of livestock in the tropics: Thermal equilibrium; Effects of heat stress on dairy cattle production; Prescriptive measures for reducing heat stress. Management of cattle: Characteristics of *Bos indicus*/ *Bos taurus* cattle; The effect of environment and genotypes on cattle performance; Ruminant nutrition; General management of calves. Health issues in livestock production: Recognition of disease – clinical signs; Prevention and control of diseases. Management of mono-gastrics: pigs: Bio-economic traits; Breeds and breed improvement; Methods of genetic improvement; Genetic defects in pigs; Nutrition; Summary of losses which occur in pig enterprises due to poor management; Health.

Student Assessment Strategies

Continuous assessment constitutes 60% which will be composed of 2 Tests; 2 assignments/ at least 3 marked practcals. Examination 40% (1 X 3 hours)

F2512CQ INTRODUCTION TO STATISTICS

Module Title:	INTRODUCTION TO STATISTICS
Module Code	F2512CQ
NQF Level	5
Notional Hours	140
Contact hours	4 hours lectures per week for one semester 2 hour alternate tutorial sessions
Additional learning requirements	
NQF Credits	14
(Co-requisites)	
Prerequisite	Elementary agricultural mathematics and statistics
Compulsory/Elective	Compulsory
Semester Offered	2
Module Content	

Introduction to statistics: Basic definition, role of statistics, branches of statistics – descriptive and inferential, basic statistical notations and symbols. Data types: Categorical versus discrete and Continuous versus numerical; Data sources: Primary versus secondary; Types of measurements: Nominal, ordinal, interval and ratio scales; Collection and presentation of data: Tabular forms; frequency tables, cross- tabulations (two variables), Graphical methods; bar charts, histogram, pie charts, frequency polygons, stem-and-leaf plots, box and whiskers plot, ogives; Identifying outliers; Measures of central tendency (grouped and ungrouped data case: Mean, median, mode, quartiles; Measures of dispersion: Skewness, measures of skewness and kurtosis; variance, standard deviation, range, inter-quartile range; coefficient of variation. Basic Set theory: Definitions; Venn diagrams; Distributive Law; De Morgan's Law; Counting techniques: permutation and combination; Probability: definition using relative frequency; properties: axioms of probability, random experiments, sample space and events, addition rule, mutually exclusive events, conditional probability; total probability; Bayes Theorem and independence; Random variables: expectations, random vectors; functions of random variables and probability density in discrete and continuous case; Probability distributions: Bernoulli; Binomial; Poisson, Geometric; Uniform; Normal; Binomial and Normal tables, Point estimation and confidence interval: CI for population mean and difference between two means for both large and small sample size case. Hypothesis testing: Formulation Single population mean, paired and independent samples for both small and large sample cases. Regression and correlation: Definitions, uses, SLR model assumptions, OLS technique, and model validation. Correlation analysis, scatter diagrams, Pearson's correlation coefficient; Spearman's rank correlation and the coefficient of determination.

Student Assessment Strategies

Continuous assessment (at least two tests, two tutorial test and two assignments) 50%; Examination 50% (1x3 hour Examination paper).
Pass mark for the module is 50%.

B.3.3 THIRD YEAR

F2600BF FIELD ATTACHMENT

Module Title:	FIELD ATTACHMENT
Module Code	F2600BF
NQF Level	6
Notional Hours	160
Contact hours	16 weeks (extended into Semester 1)
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester
Module content:	

It is important to train field or on-site supervisors in specific requirements for supervision and evaluation of the students on field attachment. This activity should be carried out prior to the students went on attachment. The purpose of the visits is to identify partners/sites and negotiate relationships, roles and responsibilities.

The students will now be attached to the suitable agricultural business and institutions concerned with livestock or other agribusiness. For this practical module, students spend time at real work situations under the supervision of qualified personnel. Applying the principles and techniques theoretically learnt into real-life problem-solving situations. Develop student understanding of work ethics, employment demands, responsibilities and opportunities.

Student Assessment

This is a 100% formative assessment. Report write-up contributes 60% and 40% oral presentation.

F2660BF FARM DUTIES

Module Title:	FARM DUTIES
Module Code	F2660BF
NQF Level	6
Notional Hours	60
Contact hours	4 hours per week in one semester
NQF Credits	6
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester
Module content:	

Students will undertake one full day (4 teaching hours) of farm duties every week during semester zero. These farm duties will be undertaken on campus at the various farm sections. The exercise is geared toward developing students' specific farming skills in all crop and livestock farming related activities that is ongoing at that particular time of the year. Student are arranged to participate in crop husbandry aspects including land preparation, field planting designs, sowing of different crops and vegetables, irrigation, thinning, weeding, fertilizer and pesticide application, pruning and harvesting. Post-harvest techniques: processing, threshing, storage and marketing. Student are also introduced to on-farm animal husbandry practices: including identification, tagging, castration, dehorning, vaccination, artificial insemination and pregnancy diagnosis, and animal judging/selection. Further, they will be involved in general farm work regarding implement operations and maintenance: tractor driving and implement handling; fence maintenance, pump and borehole maintenance; Record keeping: computerization and analysis of farm and financial records, agronomic data recording.

Student Assessment

Assessment will be based on attendance of 80% and completion of given practical reports at various section of the farm. At least 4 practical reports with an average of 50%.

YEAR THREE, SEMESTER ONE

F2611BE EXTENSIVE ANIMAL PRODUCTION

Module Title:	EXTENSIVE ANIMAL PRODUCTION
Module Code	F2611BE
NQF Level	6
Notional Hours	160
Contact hours	4 Lecture hours per week and 3 Practical hours per week for one semester
Additional learning requirements	Minimum of one (1) excursion (outside the normal practicals)
NQF Credits	16
(Co-requisites)	
Prerequisite	Livestock Production Systems
Compulsory/Elective	Compulsory
Semester Offered	Semester 1
Module content:	

Introduction: Importance of the sector; Characteristics of extensive production in Namibia; Constraints affecting extensive livestock production in Namibia; Production systems; Breeds of beef cattle, sheep and goats; Handling facilities for beef cattle and small stock in communal areas and commercial farms: Fences/camps; Handling pens; Water supply; Troughs; Crushes and Corridors.
Herd management of extensively kept beef cattle and small stock Management from mating to calving: Breeding seasons; Bull: cow ratio/Buck or Ram: Doe or ewe ratio; Mating methods; Pregnancy diagnosis; Calving/kidding/lambing and assistance required. Management after calving/lambing/kidding: Records; Identification; Castration; Dehorning; Weaning; Age determination; Vaccination, dosing and dipping. Large stock/small stock management calendars. Reproduction and fertility: Economic importance of fertility: Herd/flock fertility. Breeding: Aims of breeding program; Cross breeding (advantages & disadvantages); Out crossing (advantages & disadvantages); Selection. Nutrition of beef cattle, goats and sheep; Record keeping; Growth and development of muscle; fat and connective tissues. Conversion of muscles to meat during slaughtering and processing; Meat quality and customer concerns. Biosecurity.

Student Assessment Strategies
Continuous assessment constitutes 60% which will be composed of 2 Tests; 2 assignments/ field practicals.
Examination 40% (1 X 3 hours)

F2631BF	FARM MANAGEMENT
Module Title:	FARM MANAGEMENT
Module Code	F2631BF
NQF Level	6
Notional Hours	140
Contact hours	3 Lectures + 2 Tutorials / Week for one semester
Additional learning requirements	Group works, case studies
NQF Credits	14
(Co-requisites)	
Prerequisite	Basic Economics
Compulsory/Elective	Compulsory
Semester Offered	1
Module Content	

Management and Decision Making: definition and objectives of farm and financial management, types of farms and farm structures, decision-making environment in agriculture; Farm Accounting & Record keeping: farm records, diagnostic analysis and financial analysis (balance sheet analysis; income statement analysis, cash flow analysis); Applying Economic principles: choosing production levels, and input and output combinations; Budgeting: enterprise budgeting, partial budgeting, and whole farm budgeting; Managing Risk and Uncertainty: sources of risk and uncertainty, and tools for managing risk, Income Tax Management: objectives of tax management, depreciation and asset valuation; Investment Analysis: time value of money, and the methods of investment analysis; Capital and Credit: sources of capital, types of loans, and sources of loan funds; Human Resources & Capital Management: planning farm labor resources, planning of farming equipments & implements, obtaining and managing farm employees, and agricultural labour regulations.

Student Assessment Strategies

1. Continuous Assessment 60%: 2 Tests accounting for 40% and practical assessments accounting for 20%.
2. Examination 40% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F2651BR	RANGELAND MANAGEMENT
Module Title:	RANGELAND MANAGEMENT
Module Code	F2651BR
NQF Level	6
Notional Hours	160
Contact hours	4 Lecture hours / week; 3 Practical hours / week per semester
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1
Module content:	

Basic terminologies: Pastures, veld, ecological capacity, carrying capacity; biodiversity, ecosystem stability, resilience, range reinforcement, legumes, forages, fodder, stocking rates and rangeland sustainability; Overview on rangeland roles and challenges in Namibia; Rangeland ecosystem components: (biotic and abiotic factors): vegetation, livestock soil, and climate; Rangeland/veld types and characteristics: sour, mixed and sweet; Morphology of common range plants: structure of a grass plant, flowering, stem & leaf development, elongation and tillering; Growth cycle of plants and plant & seed dormancy; Introduction to systematic botany with special focus on annuals & perennials range plants, C3 vs. C4, shrubs, trees & bushes; Plant succession: pioneer, sub-climax and climax; retrogression and die-back rate; Factors influencing succession process; Animal-plant interactions on range: pollinations, role of faeces, urine and trampling on range plants; Plant adaptation to herbivory and poisonous plants; Grazing management

systems: continuous, rotational multi-camp (controlled selective grazing and non-selective grazing), combined planned grazing, deferment; zonal/centripetal grazing; Forms of range degradation: bush encroachment, overgrazing, erosion and desertification- (causes and control measures); Land reclamation/restoration methods; Measuring biodiversity (plant and animal diversity) in rangeland ecosystems: species richness, composition, evenness and diversity index; Range condition assessment & monitoring methods (Transect, quadrat methods, ecological index, grazing value and ecological index); Estimation of biomass production: Carrying capacity and stocking rate estimations in rangelands; Veld fire management; Pasture/Fodder production and management: forage species selection criteria, pasture establishment and fertilization, seeds and forage harvesting, processing and conservation methods; Importance of tropical forage legumes in pastures; Drought management strategies and Fodder flow planning.

Student Assessment

1. Continuous 60% which will be composed of at least 2 Test; 2 assignments and 5 lab/field practical reports.
2. Examination 40% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F3601AG	GAME RANCHING
Module Title:	GAME RANCHING
Module Code	F3601AG
NQF Level	6
Notional Hours	90
Contact hours	2 Lecture hours / week; 3 Practical hours / week for one semester
NQF Credits	9
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module content:	

Roles of Game Ranching: Role of game ranching at the farm level, contribution to the national economy; Ethics & reasons for conserving & preserving game animals; Comparative productivity indices of selected game and domestic animals; Opportunities and constraints to Game Ranching; Ecological roles, social behaviours and peculiar characteristics/identification of game species of interest: Small & large herbivores, carnivores, dangerous game & game birds; Eco-zones where game could be an economic asset; Game ranch management: Selecting a suitable game farm; Converting a livestock ranch into a game farm; Game habitat identification & evaluation, carrying capacity & stocking rates; practising a crude form of grazing rotation & habitats utilization through; Use of fence, water & licks; fire; water provision; look-out posts/towers; dietary supplementation; Basic concepts on game population dynamics & monitoring; Game counting methods including mathematical computations; Effect of diseases and parasites on game populations; Systems of production and their economic returns; Consumptive and non-consumptive utilization of game animals; Game capture, infrastructure and transportation including legal and operational requirements; Meat and trophy processing with special focus: on animal skinning, preparation of trophies & final trophy handling and, by-products; Importance, establishment & legal requirements of game conservancies; Game farm economics: Development capital, running costs & profitability, general trends and; Markets and marketing. Human-wildlife conflict and value addition of game products.

Student Assessment

1. Continuous Assessment 60% which will be composed of 2 Tests; 2 assignments and 4 marked practicals.
2. Examination 40% (1 x 2 hours paper)
3. To pass this module a student should obtain a minimum final mark of 50%.

YEAR THREE, SEMESTER TWO

F2612BH	FARM ANIMAL HEALTH
Module Title:	FARM ANIMAL HEALTH
Module Code	F2612BH
NQF Level	6
Notional Hours	160
Contact hours	4 hours lecture periods per week and 3 hours practical every week for one semester.
Additional learning requirements	None
NQF Credits	
(Co-requisites)	
Prerequisite	Animal anatomy and Physiology
Compulsory/Elective	Compulsory
Semester Offered	Semester two
Module Content	

Introduction: losses due to animal ill-health or mismanagement; concepts of health and disease; disease development and body response in livestock. Introduction to epidemiology. Introduction to pharmacology. Introduction to parasitology. Introduction to toxicology. Introduction to bacteriology. Introduction to virology. Congenital and environmental induced defects. Infectious diseases: infectious agents (bacteria, viruses, parasites); overview of notifiable diseases caused by bacteria, viruses, fungi and yeast; poisonous plants; heavy metals; Important common, economic and/or zoonotic diseases of domestic animals; diseases of cattle, sheep, goats, pigs and poultry in Namibia; Other topics; restraint of animals, clinical examination, specimen collection, hygiene and sanitation as performed by veterinarian and technicians on the farm as well as manipulating laboratory techniques necessary for diagnosing diseases of domestic animals.

Student Assessment Strategies

Student assessment for module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., 2 tests, at least 5 assessed practicals and 1 assignments/quizzes) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

F2632BI	INTENSIVE ANIMAL PRODUCTION
Module Title:	INTENSIVE ANIMAL PRODUCTION
Module Code	F2632BI
NQF Level	6
Notional Hours	160
Contact hours	3 Lecture hours per week and 3 Practical hours per week for one semester
Additional learning requirements	Minimum of one (1) excursion (outside the normal practicals)
NQF Credits	16
(Co-requisites)	
Prerequisite	Livestock Production Systems
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content

Pig Production: Status of pig production in Namibia; Terminologies used in pig production; Common pig breeds; Production systems; Pig production cycle; Management of gilts, sows boars and piglets; Selection of breeding stock; Feeding; Housing; Diseases; Marketing, transportation and animal welfare; Pig slaughter and product quality, Processing, preservation and storage of animal products.

Dairy production: Status of dairy industry in Namibia; Breeds of dairy cattle & production systems; The production cycle and management of dairy cattle; Lactation cycle of a dairy cow; Milk production persistency; Nutrient requirements of a dairy cow; Problems associated with underfeeding of dairy cows; Grouping strategy of feeding dairy cows; Body Condition Score (BCS) in dairy cows; Breeding and oestrus cycle; Post-partum management of dairy cows; Milking facilities; Milking procedures; Metabolic diseases associated with dairy cows; Vaccination schedule for dairy cows; Preservation, Processing, and storage of dairy products.

Poultry production: Namibian poultry industry, Importance of poultry production; Production systems; Common chicken breeds and their characteristics in Namibia; Brooding and Management of chicks; Importance of ventilation in the brooder and chickens house. Indigenous chicken production:

Broiler production - Main Broiler production systems; Broiler feeds and feeding, and management of broilers; Diseases; Vaccination program for broilers, Process of chicken slaughter and processing; Storage; Chicken cuts. *Layers Production* - Rearing of laying chicks from day-old to 17 weeks; Rearing from laying to culling, Layer feeds and feeding– from day old to culling; Diseases; Vaccination program for layers; Reproductive physiology of a hen; Process of egg formation; Quality attributes of an egg; Process of egg incubation; Egg candling; Hatching process; Sexing of chicks; egg collection, handling, grading and marketing.

Student Assessment Strategies

Continuous assessment constitutes 60% which will be composed of 2 Tests; 2 assignments/field practicals.
Examination 40% (1 X 3 hours)

F3612EE	AGRICULTURAL EXTENSION & GROUP DYNAMICS
Module Title:	AGRICULTURAL EXTENSION & GROUP DYNAMICS
Module Code	F3612EE
NQF Level	6
Notional Hours	140
Contact hours	4 Lectures / 2 hours tutorials alternating every 2 week
Additional Information requirements	Field Trips
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2
Module Content:	

Introduction to Agricultural Extension: concepts of agricultural extension and education, Review of historical background and recent trends in agricultural extension, principles of agricultural extension; the role of agricultural

extension in agricultural development; Adult Learning principles: The concepts of adult education, characteristics of adults as learners and adult education principles, Communication and Extension teaching methods: individual, group and mass teaching methods, communication process and its components, various communication aids/audio visual aids, use of ICT in extension, barriers to effective communication, the change theory, concept of group dynamics and group formation; Adoption and diffusion theory: adoption process and diffusion of innovations, adopter categories, factors affecting adoption of innovations; The role of the Extension worker: major roles of extension worker in a farming community, requirements of a good extension worker. Gender issues in Extension: gender concepts and gender analysis framework; Extension Programme Planning: the planning process, implementation, monitoring & evaluation in extension. Extension Approaches: various participatory extension approaches.

Student Assessment Strategies

1. Continuous Assessment 50%: minimum of 2 Tests and 2 practical assignments.
2. Examination 50% (2 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

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F2622BM	AGRICULTURAL MARKETING AND POLICY
Module Title:	AGRICULTURAL MARKETING AND POLICY
Module Code	F2622BM
NQF Level	6
Notional Hours	70
Contact hours	3 Lectures + 1 practical per week for one semester
Additional learning requirements	Filed Trips
NQF Credits	7
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

This module introduces the basic concepts in marketing theories and place them in the unique context of food and agricultural processing, distribution, wholesaling, and retailing, where discussion of markets are integrated with business marketing principles and strategy. This module will cover the following topics: the evolution of general marketing; marketing theory; evolution of agricultural marketing; overview of agricultural marketing; characteristics of agricultural produce; objectives of agricultural marketing; market and market components; market classifications; approaches to the study of marketing;; Marketing Functions; grading and standardisation; labelling; branding; marketing channel for agricultural commodities; the elements of successful marketing channels; marketing channel roles; marketing channel power; demand and sales forecasting; market demand; sales forecast; agricultural commodity pricing and pricing policies; objectives of pricing; pricing strategy; pricing policy (pricing methods); break-even analysis; consumer or buyers behaviour; the consumer buying behaviour process; marketing mix; marketing mix elements; agricultural marketing research; types of marketing research; marketing research process; marketing strategy; marketing communications; developing of marketing plan; steps for creating a marketing plan; marketing strategy and tactics; agricultural future market; farmer's contracts; hedging concept; and agricultural supply chain in Namibia; supply chain actors; agricultural supply chain; roles of agricultural boards (Namibia agronomic board and meat board), cooperatives and farmer's organisation in agricultural marketing.
Learning and Teaching Strategies/Activities

Student Assessment Strategies

The student assessment will comprise of Individual assignments, Tests, Quizzes, and Examination.
Exams: There will be a written final examination consisting of essay questions.
Test: the students write tests to assess theirs understanding of teaching and learning materials.
Quizzes: There will be short unannounced quizzes with questions will be related to the day's assigned reading and prior class sessions.
Assignments: There will be several assignments for the student to apply the material from the lectures and the readings. The expectation is that assignments be completed individually.
The grade in this module will be comprised of the following elements

1. Continuous 60% (2 Tests (25%), assignments (15%).
2. Examination 40% (2 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

E.1.2 DEPARTMENTOF CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES

E.1.2.1 DIPLOMA IN SUSTAINABLE CROP PRODUCTION AND TECHNOLOGIES (31DCPT) – OGONGO CAMPUS

ADMISSION REQUIREMENTS

To be admitted into the Diploma in Sustainable Crop Production and Technologies (Level 6) programme, a candidate should have obtained the following grades at NSSCAS/NSSCO level or equivalents from a recognized qualification:

Subject to School-Specific Regulations, the normal basic requirement for entrance to the Diploma in Sustainable Crop Production and Technologies programme shall be:

A pass in five different subjects as follows:

- 2 subjects on NSSCAS level and obtained an "e" or higher, including Agriculture/Biology and one of Mathematics, Physics/Chemistry,
- 3 subjects on NSSCO level with a D or higher, and should include Mathematics, and Agriculture/Biology.
- English must be at minimum D grade on the NSSCO level

Admission criteria based on school leaving certificate before 2021
Subject to school special regulation, the normal basic requirement for entrance to Diploma in Sustainable Crop Production and Technologies shall be:
A pass in five different subjects as follows:

(i) On the ordinary level (NSSCO) with a minimum of 24 points on the UNAM Evaluation Scale, with English at a minimum D at the NSSCO level.

OR

(ii) With a combination of the ordinary (NSSCO) and higher (NSSCH) level with a minimum of 24 points on the UNAM Evaluation Scale with English at a minimum D at the NSSCO level.

In both (a) and (b) English must be a minimum of a D symbol at the NSSCO level and the following subject combination: Mathematic, Agriculture/Biology, Physics/Chemistry/Physical Science and any other subjects.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Compulsory (C)/ Elective (E)	(Co-requisites) / Pre-requisites	Contact hours per week (L/P/T)
Year 1 Core semester						
U3583AL	Academic Literacy I	5	8	C	None	Semester 0: 4hr/wk Semester 1: 2hr/wk Semester 2: 2hr/wk
U3403FS	Skills Portfolio	4	0	C	None	
U3583DD	Digital Literacy	4	8	C	None	Semester 0: 4hr/wk Semester 1: 2hr/wk Semester 2: 2hr/wk
F3500ZI	Issues in Agriculture	4	4	E	None	20 hours
F3520ZP	Basic Programming with Python	5	4	E	None	20 hours
Total Credits Core Semester		24				
Year 1 Semester 1						
F2401CB	Introduction to Botany	4	7	C	None	L(2hr/wk), P(3hr/alt.wk)
F2411CP	Principles of Crop Production	4	7	C	None	L(2hr/wk), P(3hr/wk)
F2421CI	Integrated Crop Farming	4	14	C	None	L(4hr/wk), P(3hr/alt.wk)
F2531CA	Elementary Agricultural Mathematics and Statistics	4	12	C	None	L(4hr/wk) P(2hr/wk)
F2451TY	Surveying	4	14	C	None	L(4hr/wk), P(3hr/wk)
Total Credits Semester 1			54			
Year 1 Semester 2						
F2432CO	Olericulture Technology	4	14	C	None	L(4hr/wk), P(3hr/wk)
F2412ED	Community Development and Rural Sociology	4	12	C	None	L(4hr/wk), P(3hr/wk)
F2432TG	Workshop Technology and Farm Structures	4	14	C	None	L(4hr/wk), P(3hr/wk)
F2452CR	Precision Agriculture and Digital farming	4	7	C	None	L(2hr/wk), P(3hr/alt.wk)
F2422TI	Irrigation Technology	4	7	C	None	L(2hr/wk), P(3hr/alt.wk)
Total Credits Semester 2			54			
Total credits Year 1			132			

Year 2 Core Semester						
U3683AL	Academic Literacy II	5	8	C	None	Semester 0: 4hr/wk Semester 2: 2hr/wk
U3420CN	National and Global Citizenship	4	2	E	None	L(1hr/wk)
U3420PJ	Project Management Skills	5	2	E	None	20 hours
U3420EM	Ethics and Morality	4	2	E	None	L(2hr/wk online)
U3520LP	Leadership Skills	5	2	E	None	L(2hr/wk for 6wk)
F3620ZP	Introduction to Statistical Programming with R	6	8	E	None	L(4hr/wk), P(3hr/wk)
Total Credits Core Semester			24			
Year 2 Semester 1						
F2511CE	Introduction to Plant Genetics	5	14	C	None	L(4hr/wk), P(3hr/wk)
F2532CL	Basic Agro-Climatology	5	14	C	None	L(4hr/wk), P(3hr/wk)
F2501CC	Anatomy and Physiology of Crops	5	7	C	Principles of Crop Production	L(2hr/wk), P(3hr/alt.wk)

F2531EB	Entrepreneurship and Business Development	5	12	C	None	L(3hr/wk), P(3hr/wk)
Total Credits Semester 1			47			
Year 2 Semester 2						
F3512CI	Introduction to statistics	5	12	C	Elementary Agricultural Mathematics and Statistics	L(4hr/wk), P(2hr/wk)
F2412CG	Fruit Production Technology	5	14	C	None	L(4hr/wk), P(3hr/wk)
F2552CN	Soil Science	5	14	C	None	L(4hr/wk), P(3hr/wk)
F3732CQ	Crop Analytical Techniques	5	7	C	None	L(2hr/wk), P(3hr/alt.wk)
Total Credits Semester 2			47			
Total credits Year 2			118			

Year 3 Core Semester						
W2600CM	Field Attachment	6	24	C		4-6 months continue in Sem 1
Total Credits Core Semester			24			
Year 3 Semester 1						
F2611CK	Crop Environment Interaction/ Ecophysiology plants	6	8	C	Anatomy and Physiology of Crops	L(2hr/wk), P(3hr/alt.wk)
F2631CJ	Soil Fertility and Fertilization	6	16	C	Soil Science	L(4hr/wk), P(3hr/alt.wk)
F2601CH	Crop Protection	6	16	C	Principles of Crop Production	L(4hr/wk), P(3hr/alt.wk)
F2641EC	Agricultural Extension and Group Dynamics	6	14	C	None	L(4hr/wk), P(3hr/alt.wk)
Total Credits Semester 1			54			
Year 3 Semester 2						
F2612TF	Farm Power and Machinery	6	16	C	Agricultural Mathematics	L(4hr/wk), P(3hr/wk)
F2602TP	Post-Harvest Technology	6	8	C	Principles of Crop Production	L(2hr/wk), P(3hr/alt.wk
F2632CD	Plant Breeding Seed Production Technology	6	16	C	Principles of Crop Production	L(4hr/wk), P(3hr/wk)
F2602TS	Soil and Water Conservation Technology	6	8	C	Soil Science	L(2hr/wk), P(3hr/alt.wk)
Total Credits Semester 2			48			
Year 3 total credits			126			
TOTAL PROGRAMME CREDITS			376			

MODULE DESCRIPTORS

FIRST YEAR MODULES

U2583AL ACADEMIC LITERACY I

Module Title:	ACADEMIC LITERACY I
Module Code	U2583AL
NQF Level	5
Notional Hours	80
NQF Credits	8
Prerequisite	None
Contact Hours	Semester 0: 4 hours /week;
Semester 1:	2 hours/week
Semester 2:	2 hours/week
Compulsory/Elective	Compulsory
Semester Offered	0,1&2
Module Content	

The module will cover study skills, reading (including extensive reading), listening, speaking, writing, referencing, and language usage and text organisation.

Student assessment strategies
Assessment will be based on Continuous Assessment.

U3403FS SKILLS PORTFOLIO

Module Title:	SKILLS PORTFOLIO
Module Code	U3403FS
NQF Level	N/A
Notional Hours	N/A
Contact hours	N/A
Additional learning requirements	None
NQF Credits	NCB
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester, Semesters 1 & 2
Module Content	

UNIT 1: Academic Planning and Goal Setting
Individual Needs and Values; Steps in Reaching a Personal Vision; Proactive Approach Towards Learning; Self-Regulated Learning; Personal and Academic Goal Setting; Receptiveness to Learning; Exploring Self-Development and Self-Awareness.
UNIT 2: Attitude and Motivation
Understanding Motivation; Personal Attitudes, Behaviors and Interests; Self-Reflective Process; Approaches to Dealing with Negative Factors; Class Attendance and Participation; Procrastination; Self-Reliance; Discipline; Accountability; Healthy Habits.
UNIT 3: Learning styles
Understanding Personal Approaches to Learning; Dynamics of The Learning Process; Learning Styles and Strategies.
UNIT 4: Study Methods and Skills
Study Habits and Strategies; Learning Styles and Techniques; Effective Study Methods and Skills; Note Taking; Memory and Reading Skills; Critical Thinking.
UNIT 5: Time Management
Effective Time Management; Planning; Decision-making; Prioritization; Setting Boundaries; Time for Self –care; Procrastination.
UNIT 6: Assessment Preparation
In-class exercise; Test and Examination preparation; Organizing academic workload; Setting daily study goals; Staying physically active; Study groups.
UNIT 7: Mental well-being
Understanding mental health; Signs and indicators of poor mental health; commonly experienced mental health challenges; psychosocial stressors; Seeking professional help; Coping strategies.
UNIT 8: Interpersonal Communication
Effective Communication Skills; Verbal and Non-Verbal Communication; Listening Skills; Problem Solving; Assertiveness; Negotiation Skills; Practicing Empathy in Communication; Self-Confidence; Receptiveness to Feedback; Building Trust; Teamwork; Leadership; Public Speaking Skills.
UNIT 9: Financial matters and management
Financial Literacy; Budgeting; Available Finance Options and Assistance; Managing Financial Resources.
UNIT 10: Student Violence
Types of Violence; Individual Roles in Violence; Myths, Forms; Consequences of Violence; Prevention Measures; Seeking for Help.

UNIT 11: Career Planning and Development
Defining and Selecting Career Goals; Career Exploring Different Strategies; Soft Skills Training.

Student Assessment Strategies
100% continuous assessment
Reflective journal on each unit (portfolio)

U3583DD	DIGITAL LITERACY
Module Title:	DIGITAL LITERACY
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact hours	Semester 0: 4 hours /week;
Semester 1:	2 hours/week
Semester 2:	2 hours/week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content
Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites
Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time
Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues
Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia
Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings
Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks
Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog)
Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Student Assessment Strategies
1. Collaborative assessment tasks
1.1 Digital productivity: *cloud-based collaborative digital media creation using cloud platforms*
1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing
2. Individual assessment tasks
2.1 Assignment: information literacy assignment
2.2 Test x 2
3. Practical
3.1 Digital proficiency
3.2 Data and Media literacy
No written examination

F3500ZI	ISSUES IN AGRICULTURE
Module Title:	ISSUES IN AGRICULTURE
Module Code	F3500ZI
NQF Level	5
Notional Hours	40
Contact hours	20 Contact hours
Additional learning requirements	Field trips, Seminars, and quest lectures
NQF Credits	4
(Co-requisites)	
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module content
Agriculture: Agriculture as an important economic sector; Population dependence on agriculture for their livelihoods. Production systems: Production systems and production sustainability. Land tenure systems: freehold and customary tenure. Agricultural Opportunities and Restrictions: such as the veterinary cordon fence; financial collateral; and the greed in the commons. The Namibian market-driven economy and agricultural contribution: Agricultural practices; Resilience of livelihoods to withstand challenges posed by climate change; land scarcity, water; drought management relation to climate change; Cause and consequences of the supply chain of agricultural sub-sectors. Overview of sub-sectors and their value chains: cattle; sheep and goats; pigs; dairy; poultry; agronomy; horticulture; game and bio-mass. Niche markets: such as Swakara and Ethical issues of Genetically Modified Organisms (GMOs) and implications to food production systems; use of examples to demonstrate how a society's use results in different externalities to balance policy intervention.

Student Assessment strategies
1. Continuous assessment (100% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours n total), assignments, and practical reports (at least 4 gradable items).
2. A final mark of 50% is required to pass this course

F3520ZP BASIC PROGRAMMING WITH PYTHON

Module Title:	BASIC PROGRAMMING WITH PYTHON
Module Code	F3520ZP
NQF Level	5
Notional Hours	20
Contact hours	One practical session every week for the duration of CS1
Additional learning requirements	None
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module Content
Python installation; Anaconda. Data Structures and their operations; Variables; Strings; numeric variables; Lists. Control Flow; if, else and elif statements. Functions; How to use basic functions; Numpy Arrays. Pandas; Series; DataFrames. Interaction with OS; Reading and Writing files. Data Visualization; histograms; line and scatter plots.

Student Assessment Strategies
1. Student assessment will be based on formative assessment only through 100% continuous assessment.
2. The assessment comprises 1 programming assignment.
3. A minimum mark of 50% is required to pass the module.

F2401CB INTRODUCTION TO BOTANY

Module Title:	INTRODUCTION TO BOTANY
Module Code	F2401CB
NQF Level	4
Notional Hours	70
Contact hours	2 Lecture hours per week per semester3 Practical hours per alternate week per semester
Additional learning requirements	Field trips/excursions and group work
NQF Credits	7
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Overview of the three domains: Bacteria (eubacteria), Archaea (archaeabacteria) and Eucarya (eukaryotes) and the five major kingdoms of organisms and Viruses. Importance of Gymnosperms and Angiosperms; Mocotelydenous and Dicotelydenous plants. Introduction to plant taxonomy and Classification: The Binomial Nomenclature, Dichotomous key/the Plant Identification key. Structure and organization of the plant cell: Structure and importance of the cell wall, the cell membrane, and the different cell organelles. Introduction to Plant Genetics: Mendel's first and second laws; Sexual and asexual reproduction, aspects of fertilization and pollination. Chemical basis of life: Structure, Importance and Functions of macromolecules; Carbohydrates, lipids, nucleic acids, proteins and minerals. Basics of plant anatomy and physiology: Plant cell anatomy and physiology; Internal and External Plant Morphology; Photosynthesis; Cell Respiration; Cell Transpiration; Osmosis & Diffusion, Imbibition; Passive and Active transport. Introduction to Plant nutrition: Macro, Micronutrients, minerals and plant growth regulators. Introduction to ecology and the balance of nature: Naming of ecosystems and plant communities. Interrelationships among organisms: Food

chains and food webs. The cycling of matter in the ecosystem: Water cycle, Carbon cycle and the Nitrogen cycle. An overview on the concept of Evolution: The plant evolution theory.

Student Assessment Strategies
Continuous Assessment: 60 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 40% (01 x 03 hours paper).

F2411CP	PRINCIPLES OF CROP PRODUCTION
Module Title:	PRINCIPLES OF CROP PRODUCTION
Module Code	F2411CP
NQF Level	4
Notional Hours	140
Contact hours	3 Lecture hours per week per semester; 3 Practicals hours per Alternate week per semester
Additional learning requirements	Field Trips, Term Project
NQF Credits	7
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Crop environment in Namibia. Environmental factors affecting crop choice: temperature, rainfall, solar radiation, photoperiodism. Sustainable crop production and resource use efficiency: Principle of Sustainability; Concepts of Sustainable Crop Production. Cropping systems, tillage and crop establishment. The modern concept of tillage. Climate resilient agriculture and Crop diversification. Fertilization and management practices. Time of planting: Pre- and post-rain planting. Land preparation: Aims; Tillage systems – conventional, minimum, conservation tillage; Cultivation equipment. Seeding: Factors affecting seed quality; Seeding depth; Seeding rate; Plant population. Fertilizer application times, methods and fertilizer rates. Calculation of row and intra-row spacing. Cropping systems: Monoculture; Mixed culture; Intercropping production potential and mechanism, and yield advantage.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2421CI	INTEGRATED CROP FARMING
Module Title:	INTEGRATED CROP FARMING
Module Code	F2421CI
NQF Level	4
Notional Hours	70
Contact hours	4 Lecture hours per week per semester 3 Practicals hrs per week per semester
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content
Course contents: Land use systems, tillage systems, cropping systems, agroforestry systems and livestock systems in general and with reference to the Namibian farming context.
Learning and Teaching methods:
Lectures, tutorials, field visits, Field and Lab practicals and Presentation and group discussions

Student Assessment and contributions
Module Assessment: Continuous Assessment: 60% (at least 2 tests, 2 assignments and at least 5 practical activities). Exam: 40%
(1 × 3-hour paper).

F2531CA	ELEMENTARY AGRICULTURAL MATHEMATICS AND STATISTICS
Module Title:	ELEMENTARY AGRICULTURAL MATHEMATICS AND STATISTICS
Module Code	F2531CA
NQF Level	4
Notional Hours	120
Contact hours	4 hours of lectures per week per semester 2-hour tutorial sessions per week per semester
Additional learning requirements	

NQF Credits	12
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to mathematics: Branches of mathematics – (Pure, Probability and Applied), the role of mathematics in agriculture
Rate, ratios, and percentage: Share a given quantity in a specified ratio, and Use proportion to scale down or scale up quantities given a specific rate.
Measurement and mensuration: Length and distance, capacity, mass, temperature, area and volume.
Mathematics applications in agriculture: Calculation of various fertilizer contents, herbicides and insecticides rates; application rates; conversions in foreign markets; figures and Interest rates calculations
Introduction to statistics: Basic definition, the role of statistics, branches of statistics – descriptive and inferential, basic statistical notations and symbols. Data types: Categorical versus discrete and Continuous versus numerical; Data sources: Primary versus secondary; Types of measurements: Nominal, ordinal, interval and ratio scales; Collection and presentation of data: Tabular forms; frequency tables, cross-tabulations (two variables), Graphical methods; bar charts, histogram, pie charts, frequency polygons, stem-and-leaf plots, box and whiskers plot, ogives; Identifying outliers; Measures of central tendency (grouped data case): Mean, median, mode, quartiles; Measures of dispersion: Skewness, measures of skewness and kurtosis; variance, standard deviation, range, inter-quartile range; coefficient of variation

Student Assessment Strategies
Continuous assessment (at least two tests; two tutorial tests and two assignments) 60% Examination 40% (1x3 hour Examination paper).
The pass mark for the module is 50%.

F2451TY	SURVEYING
Module Title:	SURVEYING
Module Code	F2451TY
NQF Level	4
Notional Hours	140
Contact hours	4 Lecture hours per week per semester 3 Practical hours per alternate week per semester
Additional learning requirements	Field trips/excursions and group work
NQF Credits	14
	to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Measurements: horizontal and vertical distances; angles; conversion of units; linear interpolation; area and volume measurements. Types of surveys: baseline; basic; triangulation; Instruments and Software: Level, tripod and staff; Theodolite; measuring tape and wheel; total station; GPS; planimeter; google earth. Surveying procedures: booking method. Levelling methods: Longitudinal sections; contour grid. Positioning and orientation systems: geographical positioning system; gyroscope; prismatic; traverses.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2432CO	OLERICULTURE TECHNOLOGY
Module Title:	OLERICULTURE TECHNOLOGY
Module Code	F2431CO
NQF Level	4
Notional Hours	140
Contact hours	4 hours of lectures per week per semester, 3 hours practicals alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure) field attachments and group projects on campus.
NQF Credits	14

(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to vegetable production Influence of the environment on vegetable production; tillage and irrigation practices; plant nutrition; seeds and crop establishment. Vegetable classification systems: botanical; pollination; growth season; optimum growth temperature; cold/heat sensitivity; edible plant part. Importance of vegetables: economic and human nutrition importance. Cropping systems: shifting cultivation; continuous cropping; crop rotation; sole cropping and mixed cropping. Cultural practices: hardening/ acclimatization; mulching; thinning; pruning; training; earthing-up; phase planting. Good agricultural practices (GAP): organic horticultural practices; scouting; hygiene; record keeping; pollution management; pre-harvest interval; field vegetable holding shed. Production of different vegetables: leafy; root; fruit; legume; runner; exotic/indigenous vegetables. Mushroom production: cultivation technology of common mushroom species. Production requirements/ practices: environmental requirements; selection of suitable cultivars; vegetable nursery practices and management; seed dormancy. Crop protection: methods of weed; pest and disease control. Harvesting of vegetable crops: properties of vegetable commodities; harvesting indicators; harvesting methods and post-harvest handling. Marketing of vegetable crops: Good harvest and post-harvest practices; marketing strategy; selling channels; price and quality.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2412ED	COMMUNITY DEVELOPMENT AND RURAL SOCIOLOGY
Module Title:	COMMUNITY DEVELOPMENT AND RURAL SOCIOLOGY
Module Code	F2412ED
NQF Level	4
Notional Hours	120
Contact hours	3 Lectures / Week per semester
Additional learning requirements	Group work and projects
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Course Content:
Basic sociological concepts: introduce sociological concepts and their application to agriculture and rural development planning; Importance of Rural Sociology: the significance of rural sociology to agricultural extension community and rural development; Rural and Urban Populations: differences between rural and urban population; rural/urban migration culture and culture change: social interaction and social structures; groups and organization, deviance, social class and stratification; Social institutions: families; religions; social change in global perspective. Poverty and development: Poverty and wellbeing, understanding the socio-economic context of development, Community development: the concept of community development, principles of community development, ways to –coordinate community development, community development methodologies and approaches, mobilizing resources for community interventions.

Student Assessment strategies
1. Continuous 60% (2 Tests (30%), Presentations (10%), Assignments (10%).
2. Examination 40% (1X 3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F2432TG	WORKSHOP TECHNOLOGY & FARM STRUCTURES
Module Title:	WORKSHOP TECHNOLOGY & FARM STRUCTURES
Module Code	F2432TG
NQF Level	4
Notional Hours	140
Contact Hours	2 Lecture hours per week per semester 3 Practical hours per alternate week per semester
Additional learning requirements	Field trips/excursions, group work/project
NQF Credits	14

Module Assessment
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments

will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Workshop Rules: workshop safety and procedures; workshop materials: equipment and tools; selection, use and maintenance. Basic technical drawing. Arc and gas welding: fabricating simple components; Joining and assembling of metal and non-metals.

Farmstead planning: Plans and drawings. Building procedures and equipment. Structures for specific purposes: farmstead; crops; livestock; crop storage. Building economics and standards: Construction materials; specifications; bills of quantities.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2452CR	PRECISION AGRICULTURE AND DIGITAL FARMING
Module Title:	PRECISION AGRICULTURE AND DIGITAL FARMING
Module Code	F2452CR
NQF Level	4
Notional Hours	70
Contact Hours	2 Lecture hours per week per semester 3 Practical hours per alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure), field attachment and group projects on campus.
NQF Credits	7
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Definition of an introduction to Precision Agriculture and Digital farming: Importance of Precision Agriculture and Digital farming in improving agricultural productivity; conservation of the environment; farm management improvement and record keeping with reference to the Namibian production environment. Data collection to build into machine learning; traditional and new methods; data analysis; data management and their use in decision-making. Application of new technological innovations associated with the Fourth Industrial Revolution in Agriculture (artificial intelligence, robotics, Internet of things (IoT): sensors; Remote sensing; GIS; unmanned vehicles; three-dimensional printing; and nanotechnology in optimizing crop production practices and services such as mechanization; automation, green housing, seeding, weeding, pest and disease control, harvesting, processing modern irrigation, soil management, fertilizers and agrochemicals, weather monitoring, farm management, agricultural information and communication and marketing. Skills, tools, software, and equipment for Precision Agriculture and Digital farming: Economics of precision agriculture

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 5 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2422TI	IRRIGATION TECHNOLOGY
Module Title:	IRRIGATION TECHNOLOGY
Module Code	F2422TI
NQF Level	4
Notional Hours	70
Contact Hours	2 Lecture hours per week per semester 3 Practical hours per alternate week per semester
NQF Credits	7
Additional learning requirements	Field trips
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Water Resources Irrigation: Irrigation agronomy crop water requirements; irrigation water requirements. Planning an irrigation project: land evaluation; the theory and analytical methods in land evaluation; land use planning process; land classification; topographic survey and planning soil conservation. Irrigation Engineering: choosing an irrigation method; principles of plant-soil-water relations; application of irrigation to the soil; irrigation scheduling. Operation and management of Irrigation systems: Surface irrigation; sprinkler irrigation; trickle/drip irrigation. Introduction to global issues in irrigation. Sound soil and water management principles to maintain and enhance the productivity of agricultural lands: Purpose and emphasis on the environmental impact assessment process and land evaluation for a specific farm. Drainage of irrigated land. Drone technology: application on soil and field analysis for irrigation, fertilization, planting, checking nutrient levels, moisture concentrations, and erosion.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 2-hour paper). To pass this module a student must obtain a minimum final mark of 50%.

SECOND YEAR

U3683LA	ACADEMIC LITERACY II
Module Title:	ACADEMIC LITERACY II
Module Code	U3683LA
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact Hours	Semester 0: 4 hours/week Semester 2: 2 hours/week
Prerequisite	Academic Literacy I
Compulsory/Elective	Compulsory
Semester Offered	Core Semester,1&2

Module content
The module is designed for students enrolled in a bachelor's degree, which requires them to do basic research, read and listen to specific academic material, produce specific written texts and give academic presentations. The module thus focuses on enhancing academic reading, academic vocabulary, writing, listening and speaking.

Student assessment strategies
The module will be a continuous assessment based.
Assessment will include written tests, individual and group assignments, portfolio assessments and oral presentations.

U3420CN	NATIONAL AND GLOBAL CITIZENSHIP
Module Title:	NATIONAL AND GLOBAL CITIZENSHIP
Module Code	U3420CN
NQF Level	4
Notional Hours	20
Contact hours	Up to 1 contact lecture period per week for 6 Weeks
Mode of Delivery Blended:	Face-to-face and Online
Additional learning requirements	Each student will be required to work on a personal project which will include a site visit
NQF Credits (Co-requisites)	2
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
UNIT 1: Constitution and its Importance
What is a constitution; Functions of a constitution; What it contains; Constitution and democracy
UNIT 2: Global Citizenship
The meaning of global citizenship; Importance of global awareness; World issues of concern to global citizens.
UNIT 3: Civic Engagement
What do we mean by civic engagement; Dimensions of civic engagement; Indicators of civic engagement; Promoting civic engagement.
UNIT 4: Globalization
Understanding globalization; Cultural construction of neoliberal globalization; Major players; Major domains; Major Issues; Futures of Globalization
UNIT 5: Intercultural Communication
Dealing with a difference; Levels of culture; Stereotypes and generalizations; Intercultural communication Processes

UNIT 6: Sustainable Development Goals and individual action
Introduction to SDGs; Contributing to the achievement of SDGs through action

Student Assessment Strategies
Continuous assessment of 100% - Assessment will be done by completing online pop-up quizzes and developing their online portfolios of personal action as a response to tasks assigned in class.

U3420PJ	PROJECT MANAGEMENT SKILLS
Module Title:	PROJECT MANAGEMENT SKILLS
Module Code	U3420PJ
NQF Level	5
Notional Hours	20
Contact hours	2-hour lecture per week for the first two weeks and field-based practical for the remaining four weeks.
Mode of Delivery	Blended: face-to-face and online
Additional learning requirements	The field-based practicals to be undertaken in the immediate environment of the student
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2

Module Content
This module consist of two components: *The first component* is a two week theory covering the concepts (project vs programme) and the phases of project life cycle (project initiation and planning: work breakdown, development of SMART indicators, estimation of activity duration, efforts, and costs, scheduling of activities, identification of critical path, setting of milestones, stakeholder identification and categorization, stakeholder engagement, initial risk identification, and development of the initial project plan; project implementation & management: forming the project team, managing people, resources allocation, responsibilities allocation, quality assurance, leadership style and project liaison; project monitoring and control: progress reporting and communication, quality control, time management, budget and cost management, risk management and mitigation; project closure and evaluation: project evaluation, project auditing process and the closure process, and final project report). *The second component* is a four-week field-based practical where students participate in a real-life project in their immediate environment. Students are strictly required to apply the project management approach during the field-based practical.
Student Assessment Strategies
Student assessment will be a 100% continuous assessment based on weekly project progress reports (50%) and the final project report (50%). A minimum pass mark for the module is 50%.

U3420EM	ETHICS AND MORALITY
Module Title:	ETHICS AND MORALITY
Module Code	U3420EM
NQF Level	4
Notional Hours	20
Contact hours	2 hours per week – supplemented by online learning
Mode of delivery	Blended: Face-to-face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester 1 or 2

Module Content
Theoretical approaches towards ethical decision-making:
Ethical principles in perspective: Why is the principle of ethics necessary and significant? Ethics and the notion of ethical behaviour related to value systems in the organizational setting in the 21stcentury. Fundamental ethical principles: Meta-ethics implies the nature of ethics and moral reasoning. Discussions and reasoning around the role of for example self-interest are examples of meta-ethical discussions. Normative ethics guide the individual on how to determine the content of moral behaviour. Applied Ethics are related to specific realms of human action and how to address challenges within those realms. Psychological Egoism is a metaethical theory of motivation related to self-interest and forms part of the first stage of moral development. Ethical egoism is a normative theory that states that our actions ought to be done from the perspective of self-interest. The moral concept of virtue and constructive evaluation of "virtue" ethics related to virtues found in a particular society or culture. Moral responsibility comprises causality (cause and effect), knowledge (the facts, information and skills acquired by the person through education or experience) and freedom (freedom of speech and acts). Applied ethics focus on domain-specific areas for example science, health, business, education and engineering. Common ethical risks in personal life, studies and in the workplace that can lead to unethical behaviour.

Student Assessment Strategies
100% Continuous Assessment

U3520LP	LEADERSHIP SKILLS
Module Title:	LEADERSHIP SKILLS
Module Code	U3520LP
NQF Level	5
Notional Hours	20
Contact hours	1 x 2h per week for 6 weeks
Mode of Delivery	Blended: Face-to-face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Module Content
Definition and scope of leadership; History and origins of leadership; Types of leadership; Leadership versus management skills; Leader (master of self, effective manager of people, active visionary); manager; Not all leaders are managers; Not all managers are leaders; Authority versus leadership; Power versus leadership; Principles of leadership (ability, adaptive, action, empowerment, creativity, problem-solving, shared); Are leaders born or made?; Characteristics of a good leader; Functions of leaders in organizations; Leading for the future; Mentoring skills; The 21st-century leader; Ethical leadership skills; Responsible leadership skills.
Learning and Teaching Strategies/Activities
The course will be facilitated through the following learning activities: face-to-face and online lectures, and tutorials.

Student Assessment Strategies
The module will be assessed using 100% continuous assessment.

F3610ZR	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Title:	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Code	F3610ZR
NQF Level	6
Notional Hours	80
Contact hours	4 lecture periods per week and 3 hours practical per week for semester core
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Core Semester

Module Content
Learn how to navigate RStudio: how to load/save a file; load a package; access help. Examine the base R objects: vectors; matrices, arrays, lists, factors and tables; their respective characteristics, naming conventions and structures. Understand sub-setting, filtering and creation of these objects. Examine the implementation of control structures (loops and functions) in R. Investigate how R can be used for mathematical and statistical calculations. Data Cleaning and Manipulation in R: Lear how to manipulate and clean data in R; import and export data from other statistical packages and databases; aggregate data; reshape data Visualisation (Packages): Learn how basic plots are generated in R – histograms; X-Y plots, bar charts, pie charts, scatter plot. Understand the ggplot2 package for advanced plotting; Statistical Testing: Understand how R can be for hypothesis testing. Investigate how R can be used in statistical modelling techniques (SLR)

Student Assessment Strategies
Continuous Assessment: 100 % (minimum of 2 tests (30%), 1 project assignment (presented in oral and written form, 40%), 3 marked practicals, 30%). The pass mark for the module is 50%

F2511CE	INTRODUCTION TO PLANT GENETICS
Module Title:	INTRODUCTION TO PLANT GENETICS
Module Code	F2511CE
NQF Level	5
Notional Hours	140
Contact hours	4 Lecture hours per week per semester 3 Practical hours per alternate week per semester
Additional learning requirements	Field trips/excursions and group work
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 1

Module Content
DNA Structure/Biochemistry and its packaging: Genes and alleles. Transcription, Translation and Protein Synthesis: (Introns and Exons) and the Genetic Code. Chromosomal Behavior. Basic principles of Heredity; Karyotypes and Variation. Mendelian genetics: Mendel's first and second laws, Sexual and asexual reproduction. Phenotype, Genotype, Segregation, Independent Assortment, Allelic and gene interactions: Dominance, co-Dominance, Pleiotropy, Epistasis. The Cell Cycle; Mitosis, Meiosis, Crossing Over. Gene Regulation: Molecular Mechanism and gene regulation of Prokaryotic organisms and Eukaryotic organisms. Genetic Mapping: Gene Linkages, Sex linkage, examples of Sex-Linked Genes. Introduction to Plant Genomics and their importance in evolution. Introduction of Genetic Engineering: Essential techniques in plant genetic engineering; DNA Isolation, Polymerase Chain Reaction (PCR), and Gel Electrophoresis.

Student Assessment Strategies
Continuous Assessment: 60 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 40% (01 x 03 hours paper).

F2501CC	ANATOMY AND PHYSIOLOGY OF CROPS
Module Title:	ANATOMY AND PHYSIOLOGY OF CROPS
Module Code	F2501CC
NQF Level	5
Notional Hours	70
Contact Hours	02 Lecture hours per week for 14 weeks.; 03 Practicals hours per Alternate week per semester
Additional learning requirements	Field Trips, Term Project
NQF Credits	7
(Co-requisites)	
Prerequisite	Principles of Crop production
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
History of Plant Science: Origin, domestication and improvement of cultivated plants; Taxonomy and biosystematics; Plant identification and nomenclature; Crop classification; Agriculturally important plant families; Basic genetic concepts in plant improvement. Plant structure: Cell structure, plant tissues; The Morphology and anatomy of roots, stem, leaves, flowers, fruits and seeds. Photosynthesis: Chemistry, pathways (C3, C4 & CAM). Plant Respiration: Factors affecting rates of respiration, Glycolysis, Tricarboxylic Acid Cycle, Oxidative phosphorylation. Plant growth and Development: Shoot and root growth patterns; Flowering - photoperiodism, thermoperiodism and the control of flowering in plants; Fruiting - pollination, fertilization, double fertilization, parthenocarpy, fruit setting, growth and development; Plant growth regulators. Plant propagation: Sexual and vegetative propagation; Tissue culture. Plant Water Relations: Importance; water uptake; water potential; transpiration. Nutrient uptake and transport: Phloem translocation.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2531EB	ENTREPRENEURSHIP AND BUSINESS DEVELOPMENT
Module Title:	ENTREPRENEURSHIP AND BUSINESS DEVELOPMENT
Module Code	F2531EB
NQF Level	5
Notional Hours	140
Contact hours	3 Lectures + Reflective Practices / Week per semester
Additional learning requirements	Field Trips, guest lectures, case studies
NQF Credits	12
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Theory of entrepreneurship: meaning, the importance of entrepreneurship, concepts, characteristics, classifications of entrepreneurship, problems faced by entrepreneurs in Namibia, entrepreneurial process: critical factors for starting a new enterprise, evaluating opportunities for new businesses, determining resource needs and acquiring resources; business model canvass: the revenue model, the cost model, formulating a winning strategy, the people are what matters- entry strategy- growth strategy; entrepreneurial marketing: marketing considerations- selecting the target market, market strategy. pricing strategies and marketing of services, export marketing; financing entrepreneurial ventures: sources of finance: debt and equity; entrepreneurial growth: transition from start-up to growth, the growth process and execution; intellectual property rights by understanding the mandates of BIPA; copyrights, trademarks,

trade secrets, patents, licensing; business planning process under Namibian regulations; planning process, business plan; accounting for agri-business enterprises; basic financial statements, managing cash flows, preparation of projected financial statements, applications of business ratios, small business management as well as strategies that improve performance of new business ventures; production and material, human resources, finance management, break-even analysis, operational cycle.

Student Assessment Strategies
The student assessment will comprise Individual assignments, Tests, Quizzes, and Examinations. Exams: There will be a written final examination consisting of essay questions.
Test: the students write tests to assess their understanding of teaching and learning materials.
Quizzes: There will be short unannounced quizzes with questions will be related to the day's assigned reading and prior class sessions.
Assignments: There will be several assignments for the student to apply the material from the lectures and the readings. The expectation is that assignments be completed individually.
The grade in this course will be comprised of the following elements
1. Continuous 60% (2 Tests (25%), assignments (15%).
2. Examination 40% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F3512CI	INTRODUCTION TO STATISTICS
Module Title:	INTRODUCTION TO STATISTICS
Module Code	F3512CI
NQF Level	5
Notional Hours	140
Contact Hours	4 Lecture hours per week per semester 2-hour tutorial session per week per semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Introduction to statistics: Basic definition; the role of statistics; branches of statistics – descriptive and inferential; basic statistical notations and symbols. Data types: Categorical versus discrete and Continuous versus numerical; Data sources: Primary versus secondary; Types of measurements: Nominal, ordinal, interval and ratio scales; Collection and presentation of data: Tabular forms; frequency tables, cross-tabulations (two variables), Graphical methods; bar charts, histogram, pie charts, frequency polygons, stem-and-leaf plots, box and whiskers plot, ogives; Identifying outliers; Measures of central tendency (grouped and ungrouped data case): Mean, median, mode, quartiles; Measures of dispersion: Skewness, measures of skewness and kurtosis; variance, standard deviation, range, inter-quartile range, coefficient of variation. Basic Set theory: Definitions, Venn diagrams, Distributive Law, De Morgan's Law; Counting techniques: permutation and combination; Probability: definition using relative frequency, properties; axioms of probability, random experiments, sample space and events, addition rule, mutually exclusive events, conditional probability, total probability, Bayes Theorem and independence; Random variables: expectations, random vectors, functions of random variables and probability density in discrete and continuous case; Probability distributions: Bernoulli; Binomial; Poisson; Geometric; Uniform; Normal, Binomial and Normal tables, Point estimation and confidence interval: CI for the population mean and the difference between two means for both large and small sample size case. Hypothesis testing: Formulation of Single population mean, paired and independent samples for both small and large sample cases. Regression and correlation: Definitions, uses SLR model assumptions, OLS technique, and model validation. Correlation analysis, scatter diagrams, Pearson's correlation coefficient, Spearman's rank correlation and the coefficient of determination.

Student Assessment Strategies
1. Continuous assessment (at least 2 tests, 2 tutorial tests and 2 assignments) 50%; Examination 50% (1 x 3-hour paper).
2. To pass this module a student must obtain a minimum final mark of 50%.

F2412CG	FRUIT PRODUCTION TECHNOLOGY
Module Title:	FRUIT PRODUCTION TECHNOLOGY
Module Code	F2412CG
NQF Level	5
Notional Hours	140
Contact hours	4 hours of lectures per week per semester, 3 hours practicals alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure) and group projects on campus.
NQF Credits	14
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 2

Module Content
Importance of fruits: economic and human nutrition importance. Propagation methods: sexual and asexual methods of propagation; their advantages and disadvantages. Seed Dormancy: causes (internal and external factors) and methods of breaking dormancy. Methods of Vegetative Propagation: cutting; grafting; budding and layering techniques. Techniques of propagation through specialized organs: corms; runners and suckers. Factors influencing rooting of cutting and layering: physiological condition of the mother plant; Juvenility; type of the wood; the presence of leaves and buds; the presence of viruses; the position of the basal cut in the cutting; season; treatment of cuttings and environmental conditions. Graft incompatibility: anatomical; studies of graft/bud union and scion-stock relationship and their influences. Use of growth regulators in propagation: methods of application; seed dormancy and germination. Micro – Propagation: applications; principles; practices and stages of micro-propagation. Nursery practices: environmental factors affecting nursery management; soil sterilization; pot-filling; preparation of nursery beds and sowing of seeds; hardening and transplanting. Major tropical and subtropical fruit species: indigenous fruit tree species and nuts; citrus; mangoes; pawpaw; grapes; peaches; figs; dates; guava; marula and macadamia nuts. Good agricultural practices (GAP): scouting; hygiene; record keeping; pollution management; pre-harvest interval; field fruit holding shed. Soil and climatic requirements: establishment; management practices. Crop protection: methods of weed; pest and disease control. Harvesting: harvesting indicators; harvesting methods and post-harvest technology. Marketing: good harvest and post-harvest practices; marketing strategy; selling channels; produce quality and marketing success.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2532CL	BASIC AGRO-CLIMATOLOGY
Module Title:	BASIC AGRO-CLIMATOLOGY
Module Code	F2532CL
NQF Level	5
Notional Hours	140
Contact Hours	3 Lecture hours per week per semester 3 Practicals hrs per week per semester
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Definitions: climatology, agro-climatology, meteorology, agro-meteorology, weather. Elements of climate and equipment of standard meteorological stations. Relations between climate and agriculture with reference to crops, livestock, pests and diseases. Climate classifications: Köppen's classification, numerical realisation, Climatic diagrams by Walter and Lieth; Climate variability and change. Climatic factors: rainfall, solar radiation, temperature, relative humidity, wind and air pressure. Evaporation and evapotranspiration. The climate of Southern Africa. Crop production in drylands: Effects of seasons, cropping season duration, onset and cessation; dry spells; fundamentals of cropping systems and crop diversification); irrigation application in drylands for sustainable crop production.

Student Assessment and contributions
Continuous Assessment: 60 % (minimum of 2 tests, 2 assignments, at least 3 practicals). Examination: 40% (01 x 03 hours paper),

F3511CP	SOIL SCIENCE
Module Title:	SOIL SCIENCE
Module Code	F3511CP
NQF Level	5
Notional Hours	140
Contact hours	4 Lecture hours/Week per semester 3 Practical hours/Week per semester
Additional learning requirements	Field trips /excursions and group work
NQF Credits	14
(**Co-requisites)**	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Origin and development of soil. General physical properties of soil: weathering and soil formation processes; the soil profile differentiation and morphology; soil phases; volume and mass relationships of soil constituents; soil texture; soil structure. Soil water: movement and availability. atmosphere and temperature. General chemical properties of soil:

soil mineralogy; ion exchange; pH; buffer action; alkalinity; soil acidification and salinization of soil. Soil fertility and fertilization: nutrient content; nutrient availability; organic and inorganic; fertilizer types; fertilizers formulation and calculations, fertilizers applications. Practical work: Laboratory evaluation of simple soil characteristics; Field practicals on soil formation in some areas of Namibia.

Student Assessment Strategies
Continuous Assessment: 60 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 40% (01 x 03 hours paper).

F3732CQ	CROP ANALYTICAL TECHNIQUES
Module Title:	CROP ANALYTICAL TECHNIQUES
Module Code	F3732CQ
NQF Level	5
Notional Hours	70
Contact hours	2 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	None
NQF Credits	7
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module content
Visualization Molecules in Living Cells: Principles of microscopy; Light microscopy; compound microscopy, Fluorescence; microscopy; Confocal microscopy; Use of fluorochromes: Flow cytometry (FACS); Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze-fracture, freeze etching. Use in biological research, auto-radiography. Interpretation and reporting software: Data logging and mining.

Student Assessment Strategies
1. Continuous Assessment: (minimum of 2 tests, 1 assignment, 14 Practicals): 50%; Examination: 50 % (1 x 3 hours paper).
2. To pass this module a student must obtain a minimum final mark of 50%.

W3700CZ	FIELD ATTACHMENT
Module Title:	FIELD ATTACHMENT
Module Code	W3700CZ
NQF Level	6
Notional Hours	240
Contact hours	6 Practical hours per day x 5 days per week for 4-6 months
NQF Credits	24
Additional Learning Requirements	None
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester

Module Content
This module is based on Work Integrated Learning (WIL). Students taking this module will be working in a farm environment in the crop production industry for 4-6 months. During the field attachment, students will work as trainees under farm/company supervision and will undertake at least two months of attachment at an appropriate venture for hands-on practical training. Students will maintain a logbook of daily activities and will be required to submit a comprehensive final report for assessment at the beginning of the following semester. Students will be visited at their workplaces by their Lecturers at least once during the attachment period.

Assessment Strategies
1. Continuous Assessment: 100% (Daily Logbook Record 20%, Lecturer/Employer Evaluation 20%, and Seminar Presentations and Oral Presentation of Final Report 50%).
2. The student will be awarded a pass or fail status, depending on performance.

THIRD YEAR

F2611CK	CROP ENVIRONMENT INTERACTION
Module Title:	CROP ENVIRONMENT INTERACTION
Module Code	F2611CK
NQF Level	6
Notional Hours	80
Contact Hours	02 Lecture hours/week per semester 03 Practicals hours/ alternate week per semester
Additional learning requirements	Field Trips, Term Project
NQF Credits	8
(Co-requisites)	
Prerequisite	Anatomy and Physiology of Crops
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Carbon fixation by crop canopies: Essential factors for photosynthesis, light penetration into crop canopy; leaf area, interception of solar radiation; crop growth rate, leaf area index, net assimilation rate; strategies for maximizing solar energy utilization; leaf area duration and plant density. Partitioning of assimilates: Harvest index; Yield components. Growth and development: Factors affecting growth and development; Growth analysis; Root growth – Factors affecting root growth and distribution; vegetative growth – Factors affecting leaf and stem growth, branching; maturation and ripening; senescence and abscission. A symbiotic relationship in plants: Mutualism (biological nitrogen fixation, mycorrhizal associations). Plant responses to environmental stress: Temperature, drought, salinity, flooding and herbivory; Stress tolerance mechanisms of Crops in Arid and Semi-Arid Conditions.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F2631CJ	SOIL FERTILITY AND FERTILIZATION
Module Title:	SOIL FERTILITY AND FERTILIZATION
Module Code	F2631CJ
NQF Level	6
Notional Hours	160
Contact hours	04 Lecture hours/week per semester 03 Practical hours/ alternate week per semester
Additional learning requirements	Field trips/excursions, group work and laboratory practical
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Soil organic matter: Carbon cycle, CO_2 global warming, bioassay, response to management practices. Soil ultimately controls the nutrient supply to plants and organisms. The health and resilience of biota are therefore closely linked to the interaction between the pedosphere and the biosphere. This course deals with the availability and uptake of macro and micronutrients: in the plant–microbial–soil system, nutrient deficiencies, and toxicities, as well as soil properties and soil environmental conditions that influence soil fertility and its suitability to act as a growth medium. Functions of each nutrient in plant metabolism and growth. Practical work includes the laboratory evaluation of soil fertility and greenhouse pot trials to investigate nutrient uptake as well as deficiencies and toxicities symptoms in plants. Review of basic soil chemistry concepts: soil pH and soil colloids and cation exchange. Solubility equilibria as applied to nutrient and solubility and movement. Salinity: meaning measurement and amendment. Soil acidity and alkalinity and amendment: liming requirements. Fertilizers: nutrients content, solubility, fertilizer formulations, losses; types of fertilizers: single fertilizers, compound fertilizers, Law of the minimum. Soil and plant analysis. Integrated nutrient management.

Student Assessment Strategies
Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 03 hours paper).

F2601CH	CROP PROTECTION
Module Title:	CROP PROTECTION
Module Code	F2601CH
NQF Level	6

Notional Hours	160
Contact hours	4 h/L per week, 3 hours practicals alternate week per semester
Additional learning requirements	Compulsory field trips/excursions (outside the normal practicals);
NQF Credits	16
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory.
Semester Offered	2

Module Content
Integrated crop management: Growing systems for the production of high-quality crops. Recognition and causes of crop disorders: Damage due to pests; Pathogens and
Environmental factors; Methods of prevention and control. Recognition, biology and control of weeds, pests and diseases: Identification of weeds; Pests and diseases; Evaluation of safe and appropriate strategies for prevention and control; Choice and rate of the product; Namibia Legislation. Composition, activity and persistence of crop protection chemicals and biological agents: Nature of pesticides and biological control agents; Formulation of pesticides; Mode of action; Persistence; Resistance; Biological agents. Application of crop protection chemicals: Pesticide application equipment; Techniques and legal requirements. Safe use, handling, transport and storage of crop protection chemicals: Hazards; Safety and legal requirements. Protection of people, the environment and the crop: Safe practice procedures and precautions.

Student Assessment Strategies
Assessment of learning outcomes should be made by the following method of assessment including final semester written examinations as well as student's presentation and communication skills, practical and laboratory exam
Continuous assessment 50% (minimum 2 tests and 1 assignment); Examination
50% (1 x 2-hour paper)

F2641EC	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Title	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Code	F2641EC
NQF Level	6
Notional Hours	140
Contact hours	3 Lectures per 3 hours alternative tutorials per Week per semester
Additional Information requirements	Field Trip
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content:
Introduction to Agricultural Extension: concepts of agricultural extension and education, Review of historical background and recent trends in agricultural extension, principles of agricultural extension; the role of agricultural extension in agricultural development; Adult Learning principles: The concepts of adult education, characteristics of adults as learners and adult education principles, Communication and Extension teaching methods: individual, group and mass teaching methods, communication process and its components, various communication aids/audio-visual aids, use of ICT in extension, barriers to effective communication, the change theory, concept of group dynamics and group formation; Adoption and diffusion theory: adoption process and diffusion of innovations, adopter categories, factors affecting adoption of innovations; The role of the Extension worker: major roles of extension worker in a farming community, requirements of a good extension worker. Gender issues in Extension: gender concepts and gender analysis framework; Extension Programme Planning: the planning process, implementation, monitoring & evaluation in extension. Extension Approaches: various participatory extension approaches.

Student Assessment Strategies
1. Continuous Assessment 40%: minimum of 2 Tests and 2 practical assignments.
2. Examination 60% (2 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F2612TF	FARM POWER AND MACHINERY
Module Title	FARM POWER AND MACHINERY
Module Code:	F2612TF
NQF Level	6
Notional hours	160
Contact Hours:	4 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional information requirements	Excursions (visits to relevant farms for exposure), field attachment and group projects on campus.
NQF Credits	16
(Co-requisites) Pre-requisite	Elementary Agricultural Mathematics and Statistics
Compulsory/Elective	Compulsory
Semester offered	2

Module content
Fundamentals of Engineering: Fundamental quantities and units; Concepts of work; Power and Torque. Farm Power sources: Animal Power; electricity; Natural Power wind energy; solar energy. Animal Power: Hitching; capability; training. Machine Power: The tractor; internal combustion engine and other sub-systems; power trains; tractor tests and performance; operation and maintenance; Safety. Tillage: Primary tillage; secondary tillage; conservation tillage; implement types and their operation. Crop planting, fertilization and weed control: Equipment types and operation; calibration safety and maintenance. Crop Harvesting: Objective, equipment types, operation, and maintenance; combine harvester types and operation. Farm Machinery Management: Machine capacity, performance; Machinery cost and selection.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). To pass this module a student must obtain a minimum final mark of 50%.

F2602TP	POST-HARVEST TECHNOLOGY
Module Title:	POST-HARVEST TECHNOLOGY
Module Code	F2602TP
NQF Level	6
Notional Hours	80
Contact Hours	2 Lecture hours per week per semester 3 Practical hours per alternate per week per semester
Additional learning requirements	Field trips and excursions
NQF Credits	8
Module Assessment	
(Co-requisites)	
Prerequisite	Principles of Crop production
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Fundamentals of postharvest technology and agro-processing: Postharvest system (durables and perishables); causes of losses; mechanical damage; pests; and diseases. Properties of crop commodities: physical; chemical; thermal; nutritional. Principles of Agricultural produce Processing: drying; size reduction; fermentation; preservation. Equipment used for Processing agricultural crops: threshers; dryers; grinders; cutters; mixers; residue disposers; shellers; millers; oil expressers. Threshing and shelling efficiency. Material handling concept and equipment: Folk lift; Screw conveyor; Belt conveyor; Bucket elevator; Pneumatic conveyors. Types of farm storage structures and Management of storage facilities: Stacking and movement of commodities. Storage losses including loss assessment methods and control measures. Pre-treatments of horticultural produce; Packaging; storage; and transportation; Quality evaluation and grading.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 2-hour paper). The pass mark for the module is 50%.

F2632CD	SEED PRODUCTION TECHNOLOGY
Module Title:	SEED PRODUCTION TECHNOLOGY
Module Code	F2632CD
NQF Level	6
Notional Hours	160
Contact Hours	4 Lecture hours/Week per semester 3 Practical hours / Week alternate per semester
Additional learning requirements	Field trips /excursions and group work
NQF Credits	16
(Co-requisites)	
Prerequisite	Principles of Crop production
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Types of cultivars: Pure lines, hybrids, synthetics, open-pollinated populations. Seed classes: Nucleus, Breeders' Foundation, Certified and Quality Declared seeds. Seed ecology: Plant growth and seed development, growth factors affecting seed quality. Seed multiplication: Seed agronomy, Field inspection, including field isolation and roguing. Harvesting and threshing: Harvesting and threshing time and methods for different crops. Seed processing:

Drying, cleaning, treatment, grading. Seed Storage: Packaging, storage facilities, storage conditions and seed inventories. Seed quality control: legislation, inspection, testing and certification. Seed marketing: Distribution and sales. Seed production in Namibia: Pearl millet, maize, sorghum and cowpea.

Student Assessment Strategies
Continuous Assessment: 60% (minimum of 2 tests, 2 assignments, at least 5 practicals). Examination: 40% (01 x 03 hours paper)

F2602TS	SOIL AND WATER CONSERVATION TECHNOLOGY
Module Title:	SOIL AND WATER CONSERVATION TECHNOLOGY
Module Code	F2602TS
NQF Level	6
Notional Hours	80
Contact hours	2 Lecture hours per week per semester 3 Practical hours per alternate week per semester
NQF Credits	8
Additional learning requirements	Excursions (visits to relevant farms for exposure), field attachment and group projects on campus
(Co-requisites)	
Prerequisite	Soil Science
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Soil Erosion: Erosion types and processes; Estimating soil losses (Measurement and Prediction). Soil and water conservation principles and their importance to agricultural development; Erosion and control methods: (Agronomic and mechanical control, Gully erosion control and wind erosion control); principles of Conservation agriculture. Sound soil and water management principles to maintain and enhance the productivity of agricultural lands; Land use planning process: Purpose and emphasis of an environmental impact assessment process; land evaluation; the theory and analytical methods in land evaluation and land classification; Topographic Survey and planning soil conservation for a specific farm

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

E.2 UNDERGRADUATE DEGREE PROGRAMMES

E.2.1 DEPARTMENT OF ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS

E.2.1.1 BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS (Level 7) (NEUDAMM CAMPUS) 31BSAE

ADMISSION REQUIREMENTS

Subject to School Specific Regulations, the normal basic requirement for entrance into the Bachelor of Science in Agricultural Economics degree programme shall be:

(i) A pass in five different subjects as follows:
(a) Two (2) subjects on NSSCAS level with an average "d" or higher including one of Mathematics, Biology, or Agriculture
(b) Three (3) subjects on NSSCO level with a "C" or higher in Mathematics, Biology and Agriculture.
(c) English must be a minimum "C" at the NSSCO level
(d) The five subjects must include English and Mathematics.

Or

(ii) A pass in five different subjects as follows:
(a) Three (3) subjects on NSSCAS level with an average "d" or higher including Mathematics, Biology, or Agriculture
(b) Two (2) subjects on NSSCO level with a "D" or higher including Mathematics, Biology and Agriculture
(c) English must be a minimum "C" at the NSSCO level
(d) The five subjects must include English and Mathematics.

(iii) Candidates with a three-year Diploma in Agriculture or other related fields at NQF Level 5 from a recognized and accredited institution may be granted admission to the Bachelor of Science in Agricultural Economics degree programme. Such candidates may be exempted from certain modules in the degree programme provided that the equivalent module(s) was/were passed with an average of 60% or higher.

(iv) Candidates with a relevant Diploma at NQF level 6, maybe exempted from certain modules in the degree programme provided that the equivalent module(s) successfully completed.

PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisites)/ Pre-requisites	Contact hours per week (L/P/T)
Year 1 Core Semester						
U3583AL	Academic Literacy I	5	8	C	None	40 hours
U3403FS	Skills Portfolio	4	0	C	None	
U3583DD	Digital Literacy	4	8	C	None	Sem 0: 4hr/wk Sem 1: 2hr/wk Sem 2: 2hr/wk
F3500ZI	Issues in Agriculture	4	4	E	None	20 hr
F3520ZP	Basic Programming with Python	5	4	E	None	20 hr
Total Credits Core Semester			24			
Year 1 Semester 1						
F3521CE	Agronomy	5	12	C	None	L:4h/w, P:0h/w, T:0h/w
F3511EB	Introduction to Microeconomics	5	12	C	None	L:4h/w, P:0h/w, T:1h/w
F3531EM	Introduction to Mathematics for Economists	5	12	C	None	L:4h/w, P:0h/w, T:3h/w
F3551EI	Agriculture and Information Systems	5	7	C	None	L:4h/w, P:0h/w, T:0h/w
Total Credits Semester 1			48			
Year 1 Semester 2						
F3512EB	Introduction to Macroeconomics	5	12	C	None	L:4h/w, P:0h/w, T:1h/w
F3532EB	Agribusiness Finance	5	12	C	None	L:4h/w, P:0h/w, T:1h/w
F3532AS	Introduction to Statistics	5	12	C	None	L:4h/w, P:2/w, T:0h/w
F3512AL	Livestock Production Systems	5	14	C	None	L:4h/w, P:3h/w, T:0h/w

Total Credits Semester 2			50			
Total credits Year 1			122			
Year 2 Core Semester						
U3683AL	Academic Literacy II	6	8	C	None	40 Contact hours
F3600EF	Farm Duties	6	8	C	None	40 Contact hours
F3610ZR	Introduction to Statistical Programming with R	6	8	C	None	40 Contact hours
Total Credits Core Semester			24			
Year 2 Semester 1						
F3631EI	Intermediate Economics	6	14	C	Basic Microeconomics and Basic Macroeconomics	L:4h/w, P:0h/w, T:3h/w
F3631EP	Production Economics	6	14	C	None	L:4h/w, P:0h/w, T:3h/w
F3631ES	Community Development and Rural Sociology	6	14	C	None	L:4h/w, P:0h/w, T:0h/w
F3621TE	Agricultural Engineering	6	8	C	Agricultural Mathematics	L:4h/w, P:0h/w, T:3h/w
Total Credits Semester 1			50			
Year 2 Semester 2						
F3612EF	Farm Management	6	14	C	None	L:4h/w, P:0h/w, T:3h/w
F3632EE	Agricultural Extension and Group Dynamics	6	14	C	None	L:4h/w, P:0h/w, T:0h/w
F3652EM	Mathematics for Agricultural Economists	6	16	C	None	L:4h/w, P:0h/w, T:3h/w
F3602EA	Agricultural Economics Practices prep [CWIE prep]	6	8	C	None	L:2h/w, P:0h/w, T:1h/w
Total Credits Semester 2			52			
Year 2 Total Credits			122			
Year 3 Core Semester						
F3683EA	Agricultural Economics Practices (Continues to semester 2)	7	24	C	CWIE Prep	120 contact hours
Total Credits Core Semester			24			
Year 3 Semester 1						
F3711EP	Agricultural Price Analysis and Forecasting	7	18	C		L:4h/w, P:0h/w, T:3h/w
F3731EE	Econometrics for Agricultural Economists	7	18	C	None	L:4h/w, P:0h/w, T:3h/w
F3751EM	Economic Methods for Agribusiness	7	16	C	None	L:4h/w, P:3h/w, T:0h/w
Total Credits Semester 1			52			
Year 3 Semester 2						
F3712EE	Entrepreneurship [Online]	7	16	C	None	L:4h/w, P:0h/w, T:2h/w
F3732EA	Agricultural Marketing [Online]	7	16	C	None	L:4h/w, P:0h/w, T:2h/w
F3752ER	Agriculture and Rural Development [Online]	7	16	C	None	L:4h/w, P:0h/w, T:2h/w
Total Credits Semester 2			48			
Year 3 total credits			124			
TOTAL CREDITS FOR THE PROGRAMME			372			

MODULE DESCRIPTORS

FIRST YEAR

U3583AL	ACADEMIC LITERACY I
Module Title:	ACADEMIC LITERACY IB
Module Code	U3583AL
NQF Level	5
Notional Hours	80
NQF Credits	8
Prerequisite	None
Contact Hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Compulsory/Elective	Compulsory
Semester Offered	0,1&2

Module Content
The module will cover study skills, reading, listening, speaking and writing, referencing, language usage and text organisation.
Learning and teaching strategies
The course will be facilitated through, but not limited to, the following learning activities:

- Blended instruction: Face-to-face and online
- Tests and assignments
- Tutorials/ Academic support
- Oral presentations

Student assessment strategies
Assessment will be based on Continuous Assessment.
Learning and teaching enhancement strategies

- Students shall be exposed to library user-based services and training.
- Students that might experience performance difficulty in the module will be identified and the necessary support and guidance as an intervention strategy will be provided by the teaching staff.
- Statistics of the module pass and failure rate will be continuously kept.
- Student-lecturer evaluation
- Lecturer-peer evaluation
- Curriculum review
- Moderation of assessment tools

U3583DD	DIGITAL LITERACY
Module Title:	DIGITAL LITERACY
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact Hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content
Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites. Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time. Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues. Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia. Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings. Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks. Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog). Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Student Assessment Strategies
1. Collaborative assessment tasks

1.1 Digital productivity: cloud based collaborative digital media creation using cloud platforms
1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing
2. Individual assessment tasks
2.1 Assignment: information literacy assignment
2.2 Test x 2
3. Practical
3.1 Digital proficiency
3.2 Data and Media literacy
No written examination

F3500ZI	ISSUES IN AGRICULTURE
Module Title:	ISSUES IN AGRICULTURE
Module Code	F3500ZI
NQF Level	5
Notional Hours	40
Contact hours	20 Contact hours
Additional learning requirements	Field trips, Seminars, and quest lectures
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

.

Module content

Agriculture: Agriculture as important economic sector; Population dependence on agriculture for their livelihoods. Production systems: Production systems and production sustainability. Land tenure systems: freehold and customary tenure. Agricultural Opportunities and Restrictions: such as the veterinary cordon fence; financial collateral; and the greed in the commons. The Namibian market-driven economy and agricultural contribution: Agricultural practices; Resilience of livelihoods to withstand challenges posed by climate change; land scarcity, water; drought management relation to climate change; Cause and consequences of the supply chain of agricultural sub-sectors. Overview of sub-sectors and their value chains: cattle; sheep and goats; pigs; dairy; poultry; agronomy; horticulture; game and bio-mass. Niche markets: such as Swakara and Ethical issues of Genetically Modified Organisms (GMO's) and implications to food production systems; use of examples to demonstrate how a society use result into different externalities to balance policy intervention.

Learning and Teaching Strategies/Activities

- Face-to-face lectures and/or online lectures/activities (pre-recorded or real-time)
- Face-to-face or online tutorials.
- Self-study tasks and assignments

Student Assessment strategies

a) Continuous assessment (100% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
b) A final mark of 50% is required to pass this course

F3520ZP	BASIC PROGRAMMING WITH PYTHON
Module Title:	BASIC PROGRAMMING WITH PYTHON
Module Code	F3520ZP
NQF Level	5
Notional Hours	20
Contact hours	One practical session every week for the duration of CS1
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module Content

Python installation; Anaconda. Data Structures and their operations; Variables; Strings; numeric variables; Lists. Control Flow; if, else and elif statements. Functions; How to use basic functions; Numpy Arrays. Pandas; Series; DataFrames. Interaction with OS; Reading and Writing files. Data Visualization; histograms; line and scatter plots.

Learning and Teaching Strategies/Activities

- Tutorials: Students will do guided practical problems.
- These will summarize the process from raw to final presentable results.

Student Assessment Strategies

- Student assessment will be based on formative assessment only through 100% continuous assessment.
- The assessment comprises 1 programming assignment.
- A minimum mark of 50% is required to pass the module.

YEAR 1 SEMESTER 1

F3521CE	AGRONOMY
Module Title:	AGRONOMY
Module Code	F3521CE
NQF Level	5
Notional Hours	120
Contact hours	L:4h/w, P:1h/w, T:0h/w
Additional learning requirements	Field Trips, Term Project
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Crop environment in Namibia. Environmental factors affecting crop choice: Temperature; rainfall, solar radiation, photoperiodism. Fertilization and management practices. Time of planting: Pre- and post-rain planting. Land preparation: Aims; Tillage systems – conventional, minimum, conservation tillage; Cultivation equipment. Seeding: Factors affecting seed quality; Seeding depth; Seeding rate. Optimization of plant population: Plant spacing, row spacing, and field planting patterns; Plant population density. Fertilizer application times, methods, and fertilizer rates. Calculation of row and intra-row spacing. Cropping systems: Monoculture; Mixed culture; Intercropping; Production potential and mechanism, and yield advantage. Sustainable agriculture and resource use efficiency: Principle of Sustainability; Concepts of Sustainable Agricultural Production. Climate resilient agriculture and Crop diversification. Organic farming: Nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures, and biofertilizers (Kelp). Precision agriculture: Smart agricultural technologies and tools.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3511EB	INTRODUCTION TO MICROECONOMICS
Module Title:	BASIC MICROECONOMICS
Module Code	F3511EB
NQF Level	5
Notional Hours	120
Contact hours	L:4h/w, P:0h/w, T:1h/w
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	C
Semester Offered	1

Module Content

Introduction to Microeconomics: Definitions and Concepts, Scarcity, choice and opportunity cost; Difference between microeconomics and macro-economics, Factors of production, Production possibility curve, Economic systems; Demand and Supply: Law of demand, Law of supply, Equilibrium, Elasticity: Types of elasticity, Determinants of elasticity; Theory of Production: Production function, factors of production, production concepts and the law of production; Cost Theory: cost concepts, short-run, and long-run costs; budget line/constraints, least-cost combination and profit maximization; Theory of consumer behaviour: basis of choice-Utility, budget constraint, equilibrium, price, and income changes; Theory of the firm: monopoly, perfect competition, monopolistic competition, oligopoly, market structures comparison; Externalities, and the role of public policy.

Student Assessment strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3531EM	INTRODUCTION TO MATHEMATICS FOR ECONOMISTS
Module Title:	INTRODUCTION TO MATHEMATICS FOR ECONOMISTS

Module Code	F3531EM
NQF Level	5
Notional Hours	120
Contact hours	L: 4h/w, P:0h/w, T:3h/w
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	C
Semester Offered	1

Module content
Algebra: representation, evaluation, simplification (addition, subtraction, multiplication, division, and factorizing, solving simple equations, summation sign, inequalities; Functions: Remainder and factor theorem with applications, drawing graphs of cubic functions, functions of more than one variable re-specifying functions. Matrices: Definition; types of matrices, matrix operations (addition, subtraction, and multiplication of matrices); Introduction to calculus differential calculus, rules of differentiation, application to marginal and total revenue, marginal cost and total cost, profit maximization, multiplier, partial differentiation rules; Derivative: higher-order derivatives, application of derivatives (maxima and minima, stationary points, price elasticity); Integration: Definition; integration rules; applications of integrals; numerical integration (trapezium rule) for consumer and producer surplus calculations.

Student Assessment strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3551EI AGRICULTURAL INFORMATION SYSTEMS

Module Title:	AGRICULTURAL INFORMATION SYSTEMS
Module Code	F3551EI
NQF Level	5
Notional Hours	120
Contact hours	L:4h/w, P:0h/w, T:0h/w
Additional Learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Introduction to agricultural information systems: main concepts and definitions; types and components of the Information system; categories of agricultural information; Scope, importance, and needs of Information systems; model of agricultural information systems. Agricultural Knowledge and Information system (AKIS): The key concepts of an Agricultural Knowledge and Information system (AKIS); Key actors in AKIS; Users and flow of agricultural Information; Barriers to the proper flow of agricultural information. Sources of agricultural information and Information ethics: Databases; Government Institutions; Agricultural Censuses such as Namibia Statistical Agency agricultural censuses and surveys, design, and implementation of agricultural surveys, types of survey and strategies for survey implementation; International Agencies (FAO-STAT, World Bank, UNDP, etc.); Deficiencies in the current databases. Agricultural Information systems in Namibia: Early warning systems and other information management systems such as Food insecurity and vulnerability information mapping system (FIVIMS). The Data preparation, its importance, and processing: - Data editing, coding, checking and storage of data; communicating of agricultural information; tools for agricultural information systems. Interactive computing: Exposure to various computer packages; Use and analysis of agricultural information; Information gaps and how to extrapolate missing information and the data presentation.

Student Assessment Strategies
- Continuous assessment (100% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A final mark of 50% is required to pass this course

YEAR 1 SEMESTER 2

F3512EB INTRODUCTION TO MACROECONOMICS

Module Title:	INTRODUCTION TO MACROECONOMICS
Module Code	F3512EB
NQF Level	5

Notional Hours	120
Contact hours	L: 4h/w, P:0h/w, T:0h/w
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	C
Semester Offered	2

Module Content

Macroeconomics: definition of concepts and analysis; Measurement and determination of national income; business cycles and economic growth, the multiplier; and the national debt; Aggregate demand and supply model: macroeconomics perspective of aggregate demand and supply; building a demand and supply aggregate model; Money and banking, function of money, measuring money, roles of banks; how banks create money; Monetary policy and banking: role of the reserve bank and regulations, stabilization policy; Macroeconomic variables: gross national product, gross domestic product, taxation in Namibia, inflation and its implications on the domestic economy; exchange rates, interest rate and investment Concept of balance of payments: National accounts: fiscal policy; International Trade and capital flows: absolute and comparative, importance of trade to the economy; Macroeconomic issues: unemployment, patterns of unemployment, changes in unemployment in a short and long-run., relationship between unemployment and inflation; Globalisation and protectionism: subsidies, tariffs, non-tariff barriers.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3532EB AGRIBUSINESS FINANCE

Module Title:	AGRIBUSINESS FINANCE
Module Code	F3532EB
NQF Level	5
Notional Hours	120
Contact hours	L:4h/w, P:0h/w, T:1h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Nature and scope of financial management: define financial management, the scope of financial management. Financial statements: Income statement; Cash flow statement; Balance sheet. Financial analysis and control: Liquidity; Solvency; Profitability; Efficiency ratios. Financing of business needs: Types of needs; Sources of finance: Creditworthiness; liquidity and credit risk assessment; Role of financial institutions in agribusiness development. Capital budgeting techniques: Time value of money, NPV, IRR, payback period, Average return.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3532AS INTRODUCTION TO STATISTICS

Module Title:	INTRODUCTION TO STATISTICS
Module Code	F3532AS
NQF Level	5
Notional Hours	120
Contact hours	L: 4h/w, T/P: 3h/w,
Additional learning requirements	None
NQF Credits	12
(Co-requisites) / prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content

Introduction to statistics: Basic definition; role of statistics; branches of statistics – descriptive and inferential; basic statistical notations and symbols. Data types: Categorical versus discrete and Continuous versus numerical; Data sources: Primary versus secondary; Types of measurements: Nominal, ordinal, interval and ratio scales; Collection and presentation of data: Tabular forms; frequency tables, cross- tabulations (two variables), Graphical methods; bar charts, histogram, pie charts, frequency polygons, stem-and-leaf plots, box and whiskers plot, ogives; Identifying outliers; Measures of central tendency (grouped and ungrouped data case): Mean, median, mode, quartiles; Measures of dispersion: Skewness, measures of skewness and kurtosis; variance, standard deviation, range, inter-quartile range, coefficient of variation. Basic Set theory: Definitions, Venn diagrams, Distributive Law, De Morgan's Law; Counting techniques: permutation and combination; Probability: definition using relative frequency, properties; axioms of probability, random experiments, sample space and events, addition rule, mutually exclusive events, conditional probability, total probability, Bayes Theorem and independence; Random variables: expectations, random vectors, functions of random variables and probability density in discrete and continuous case; Probability distributions: Bernoulli; Binomial; Poisson; Geometric; Uniform; Normal, Binomial and Normal tables, Point estimation and confidence interval: CI for population mean and difference between two means for both large and small sample size case. Hypothesis testing: Formulation Single population mean, paired and independent samples for both small and large sample cases. Regression and correlation: Definitions, uses, SLR model assumptions, OLS technique, and model validation. Correlation analysis, scatter diagrams, Pearson's correlation coefficient, Spearman's rank correlation and the coefficient of determination.

Student Assessment Strategies

- Continuous assessment (at least 2 tests, 2 tutorial test and 2 assignments) 50%; Examination 50% (1 x 3 hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3512AL LIVESTOCK PRODUCTION SYSTEMS

Module Title:	LIVESTOCK PRODUCTION SYSTEMS
Module Code	F3512AL
NQF Level	6
Notional Hours	140
Contact hours	L: 4h/w; P:3 h/w
Additional learning requirements	Excursions; group work
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Structural changes in the global livestock sector: drivers of change; impacts of changes; Climate change and livestock: impacts, adaptation and mitigation; The livestock industry in Namibia: contribution of livestock to sustainable agricultural development; livestock value chains; key lessons to learn from Botswana and Namibia export-oriented livestock industries; marketing of livestock; Systems of production: classification criteria; traditional and modern production systems; systems of beef production; Livestock management facilities: basic rules to maintain good housing; design considerations for farm buildings; Adaptive and productive components of productivity of livestock in the tropics: thermal equilibrium; heat load; heat dissipation; reducing heat load; effects of heat stress; reducing heat stress. Management of cattle: characteristics of Bos indicus and Bos taurus cattle; effects of environment and genotype on livestock production; Ruminant nutrition: nutrients; energy partitioning; digestion in cattle; Calf management: calf feeding; identification; dehorning; castration; vaccination; weaning; management of adult cattle; Health issues in livestock production: signs of good health; recognition of disease; disease prevention and control strategies; Management of pigs: bioeconomic traits; breeds and breed improvement; genetic defects; nutrition; losses that occur in pig enterprises due to poor management; external and internal parasites; infectious diseases; Sustainable livestock production: sustainable intensification; organic livestock production

Learning and Teaching Strategies/Activities

The module will be covered through a blend of lectures, practicals, excursions, case studies and projects. Some of the activities will be on individual basis, while others will be done as a group to encourage teamwork and facilitate learning. Students will do a SWOT analysis of a given livestock enterprise at Neudamm or Ogongo campus or other selected farm as part of a project.

Student Assessment Strategies

The assessment will include:

(a) Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
(i) Two tests (60% of CA mark)
(ii) Case study on livestock production enterprise (25% of CA mark)
(iii) Marked practicals/project (15% of CA mark)
(b) A 3-hour examination paper that will contribute 50 marks to the final mark.
(c) The final mark will be calculated as follows:
50% CA mark + 50% Exam mark = 100 % (final mark)

SECOND YEAR

U3683LA	ACADEMIC LITERACY II
Module Title:	ACADEMIC LITERACY II
Module Code	U3683LA
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact Hours	Semester 0: 4 hours/week Semester 2: 2 hours/week
Prerequisite	Academic Literacy I
Compulsory/Elective	Compulsory
Semester Offered	Core Semester,1&2

Module content
The module is designed for students enrolled in a bachelor's degree, which requires them to do basic research, read and listen to specific academic material, produce specific written texts and give academic presentations. The module thus, focuses on enhancing academic reading, academic vocabulary, writing, listening and speaking.

Student assessment strategies
The module will be continuous assessment based.
Assessment will include written tests, individual and group assignments, portfolio assessments and oral presentations.
Learning and teaching enhancement strategies

- Weekly task completion monitoring
- Student-lecturer evaluation
- Lecturer peer-review
- Moderation of assessment tools
- Curriculum review

F3600EF	FARM DUTIES
Module Title:	FARM DUTIES
Module Code	F3600EF
NQF Level	6
Notional Hours	80
Contact hours	40 Contact hours
Additional learning requirement	Group work
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module content:
Content of all courses in the degree program is relevant for the hands-on farm duties. Students will undertake farm duties on campuses Neudamm involving all activities and data collection on all production activities at the farm (farm mechanizations, crop, and animal husbandry activities), analysing of farm and financial records. Assessment will be based on attendance at different units of the farm under the supervision of the section supervisor at the farm level. Students will be required to participate in activities assigned to them and expected to complete such tasks with a positive attitude toward work. Students on-farm duties will work supervision of the unit head or the teaching staff.

Student Assessment Strategies

- Continuous assignments and practical reports (at least 4 gradable items).
- A practical assessment mark of at least 50% is required.
- No examination
- A final mark of 50% is required to pass this module

F3610ZR	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Title:	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Code	F3610ZR
NQF Level	6
Notional Hours	80
Contact hours	L:4h/w; P: 3h/w
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	CS

Module Content
Learn how to navigate RStudio: how to load/save a file; load a package; access help. Examine the base R objects: vectors; matrices, arrays, lists, factors and tables; their respective characteristics, naming conventions and structures. Understand sub-setting, filtering and creation of these objects. Examine the implementation of control structures (loops

and functions) in R. Investigate how R can be used for mathematical and statistical calculations. Data Cleaning and Manipulation in R: Lear how to manipulate and clean data in R; importing and exporting data from other statistical packages and data bases; aggregating data; reshaping data Visualisation (Packages): Learn how basic plots are generated in R – histograms; X-Y plots, bar charts; pie charts, scatter plot. Understand the ggplot2 package for advanced plotting; Statistical Testing: Understand how R can be for hypothesis testing. Investigate how R can be used in statistical modelling techniques (SLR)

Student Assessment Strategies
Continuous Assessment: 100 % (minimum of 2 tests (30%), 1 project assignment (presented in oral and written form, 40%), 3 marked practicals, 30%). The pass mark for the module is 50%

YEAR 2 SEMESTER 1

F3631EI	INTERMEDIATE ECONOMICS
Module Title:	INTERMEDIATE ECONOMICS
Module Code	F3631EI
NQF Level	6
Notional Hours	160
Contact hours	L:4h/w, P:3h/w, T:0h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	16
(Co-requisites)	
Prerequisite	Basic Microeconomics and Basic Macroeconomics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction: The market; budget constraints; preferences; utility and utility maximization; consumer choice and demand analysis. Consumer behaviour: Revealed preference; uncertainty; consumer surplus; market demand. Firm behaviour: Technology; profit maximization; cost minimization; cost curves; firm supply. Market structures: Monopoly and its behaviour; oligopoly; factor markets; welfare economics; game theory. Measuring of macroeconomic performance: National Income accounting identity; consumption function; Investment function; Savings; aggregate demand and aggregate supply. Theory and applications of short-run economic growth: Goods market; financial markets; IS-LM model formulation and calculation; Theory and applications of medium-run economic growth: The labour market; factor markets, AS-AD Model, unemployment. Theory and applications of long-run economic growth: Saving; capital accumulation; and output; technological progress and growth; technological progress; wages and unemployment. Role of government: Fiscal policy – government spending; taxation and role of the fiscus; monetary policy – money supply and interest rates and role of the Bank of Namibia or reserve bank; linkages of fiscal policy and monetary policy to the IS-LM curve.

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3631EP	PRODUCTION ECONOMICS
Module Title:	PRODUCTION ECONOMICS
Module Code	F3631EP
NQF Level	6
Notional Hours	140
Contact hours	L:4h/w, P:0h/w, T:3h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Nature and scope of production economics: Theory of the firm (production and resource use), cost concepts & interrelations - Optimum level of input use and optimum production: allocation of one variable input; production with two or more variable inputs (economics of input substitution); expansion path; ridgeline and least-cost combination of inputs; economies of scale; production of two or more products (economics of product substitution). Cobb-Douglas production function. Optimisation concept-cost minimization and profit maximisation: enterprise combination, technical change. Linear programming: (graphical and simplex methods) application to agricultural resource allocation problem with actual data.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3631ES	COMMUNITY DEVELOPMENT AND RURAL SOCIOLOGY
Module Title:	COMMUNITY DEVELOPMENT AND RURAL SOCIOLOGY
Module Code	F3631ES
NQF Level	6
Notional Hours	140
Contact hours	L: 4h/w; P: 0h/w; T: 0h/w
Additional learning requirements	Group work
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Basic sociological concepts: discuss the basic sociological concepts and their application to agricultural progress and rural development planning. Rural sociology vs Agricultural extension: the significance of rural sociology to agricultural extension and rural development. Rural and Urban Populations: differences between rural and urban population. Culture and Social change: social interaction and social structures; groups and organization; deviance; social class and stratification. Social institutions: families; religions; rural/urban migration and environment; social change in global perspective. Poverty and development: Poverty; ill-being and wellbeing; understanding the socio-economic context of development. Community development: stakeholders in community development and ways to –coordinate community development; methodologies and approaches; mobilizing resources for community interventions.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F3612TE	AGRICULTURAL ENGINEERING
Module Title:	AGRICULTURAL ENGINEERING
Module Code	F3612TE
NQF Level	6
Notional Hours	160
Contact hours	L:4h/w; P:3h/ aw
Additional learning requirements	Excursions, field attachment and group projects on campus.
NQF Credits	16
(Co-requisites)/Prerequisite	Agricultural Mathematics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Fundamentals of Engineering: Fundamental quantities and units; Concepts of work; Power and Torque. Farm Power sources: Animal Power; electricity; Natural Power wind energy; solar energy. Animal Power: Hitching; Capability; Training. Machine Power: The tractor; Internal combustion engine and other sub-systems; Power trains; Tractor tests and performance; Operation and maintenance; Safety. Tillage: Primary tillage; secondary tillage; conservation tillage; implement types and their operation. Crop planting, fertilization and weed control: Equipment types and operation; calibration and safety aspects. Crop Harvesting: Objective, equipment types, operation, and maintenance; combine harvester-types and operation. Farm Machinery Management: Machine capacity, performance, and costs; Machinery cost and selection. Post-Harvest Handling, Storage and Processing: Structures; equipment, operation, and maintenance. Farm Structures: phases of structural engineering; types of agricultural structures; crop housing, building components and the functions; maintenance of structures. Workshop safety and technology: equipment and tools, Soil, and water erosion: processes and conservation methods. Irrigation and drainage; types; selection, plant soil water relationship; irrigation system operation and maintenance. Drone technology: Basic operational principle; application of drone technology in agriculture; maintenance.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The

summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

YEAR 2 SEMESTER 2

F3612EF	FARM MANAGEMENT
Module Title:	FARM MANAGEMENT
Module Code	F3612EF
NQF Level	6
Notional Hours	140
Contact hours	L:4h/w, P:0h/w, T:3h/Aw
Additional learning requirements	Individual assignments and projects
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Concepts of farm management and decision-making, acquisition and the use of farm records, depreciation methods and assets valuation, economic principles-choosing production levels, economic principles in choosing input and output relationship, cost concepts, various budgets, investment analysis, risk and uncertainty management, machinery management and human resource management.

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F3632EE	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Title:	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Code	F3632EE
NQF Level	6
Notional Hours	140
Contact hours	L:4h/w, P:0h/w, T:0h/w
Additional learning requirements	Group work
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Extension concepts: Principles, principles, and philosophies; compare Modern and Traditional Extension; introduction of the new extensionist. Trends in the extension sector: The focus on globalisation and pluralism; adult learning for behavioural change. Extension methods: group contact, individual and mass contact. ICT innovation: emerging agricultural challenges faced by extensionists. Extension Approaches: Identifying and comparing agricultural extension approaches. Perception: theatrical background of farmers, attitudes, and decision-making. Programme Extension: understanding of leadership principles and leadership development in the community-run initiatives. Social change and innovation: attributes of Innovations and their rate of adoptions. Models of the communication: process; written communication news reporting articles and newsletters; setting up communication public speaking; non-verbal communication: Interpersonal communication and needs: definition and importance of group; the group as a channel of communication; group formation and functioning; group techniques. Group norms and cohesion: group goals; group members' roles; behaviour and attitude in a group; motivation of the group.

Student Assessment strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3632EM	MATHEMATICS FOR AGRICULTURAL ECONOMISTS
Module Title:	MATHEMATICS FOR AGRICULTURAL ECONOMISTS
Module Code	F3632EM
NQF Level	7

Notional Hours	140
Contact hours	L:4h/w, P:3h/w, T:1h/Aw
Additional learning requirements	Group work and discussion
NQF Credits	16
(Co-requisites)	
Prerequisite	Basic Mathematics for Economists
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:
Functions: Types of functions (constant function, polynomial functions, rational functions, non-algebraic function, exponential function, log function) and their application; Limits and Continuity. Matrix algebra: Meaning and types of matrices and their application; Transpose; trace of a matrix; Adjoint and inverse of the matrix; Cramer's rule; Determinants: Types and properties; Rank of a matrix; application of matrices in economics. Gauss method and its application to matrix algebra. Differentiation: Simple; Logarithmic differentiation; Second and higher-order Differentiation; Partial; Homogeneous function and Euler's theorem; Economic Applications of differentiation. Maxima and Minima of one variable: Maxima and Minima of two variables; Constrained Maxima and Minima; Economic Applications of Maxima and Minima. Integration: Introduce students to the basic rules of integration; methods of integration; Integration as a summation; Definite Integration, Economic Applications of Integration. Linear Programming: Introduction to Linear Programming; Formulation of Linear programming problems; Graphic methods; Simplex method and linear programming and their applications to decision making in agricultural economics and business; Linear Programming - Simplex methods

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F3602EA AGRICULTURAL ECONOMICS PRACTICES PREP

Module Title:	AGRICULTURAL ECONOMICS PRACTICES PREP
Module Code	F3602EA
NQF Level	6
Notional Hours	80
Contact hours	2h/W, 0P/W, T:1h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
The role of the agricultural economist, fields of expertise, levels in decision-making, Human resource policy and regulations, labour relationships, Leadership skills: types of leadership skills, stress, identifying sources and symptoms of stress, practicing stress management techniques and stress management, Effective communication skills and consultation skills: modes of communication, relationship-centred style, effective interviewing techniques. Interpersonal communication skills; The sub-sectors of agriculture overview stakeholders, role within the supply chain, Colloquium: guest lectures from different sectors, lectures from different institutions, debates, Work-integrated learning: expectations, selection of institutions, work conduct, work routines, and timelines, responsibilities, work environment ethics, outcome requirement, report,

Student Assessment
- Continuous assessment (100% of the final mark) consisting of a combination (or subset) and practical reports (at least 4 gradable items).
- No Final examination
- A final mark of 50% is required to pass this course

All written reports should have the following:
- Topic
- Introduction/Background
- Objectives
- Main arguments with sub-headings
- Concluding remarks
- References (using APA formatting style) – only cited sources should be referenced

Reports will be graded as follows:
- 20% oral presentation,
- 50% field attachment report
- 30% from assessment reports of the field supervisors

THIRD YEAR

F3753EA AGRICULTURAL ECONOMICS PRACTICES

Module Title:	AGRICULTURAL ECONOMICS PRACTICES
Module Code	F3753EA
NQF Level	7
Notional Hours	240
Contact hours	
Additional learning requirements	Individual assignments and projects
NQF Credits	24
(Co-requisites)	
Prerequisite	Agricultural Economics Practices Prep
Compulsory/Elective	Compulsory
Semester Offered	CS

Module content:
Content of all courses in the degree program is relevant for the hands-on farm duties to interpret the grassroots production level. Students will undertake an internship in an organization or agricultural institution approved by the department. Public and private institutions in the Agribusiness sectors will be preferred. In any other industries involved in activities such as agricultural research, agricultural production activities at the farm (farm mechanizations, crop, and animal husbandry activities) are considered important. Financial institutions and Insurance providing finance to agriculture play an important role in the agricultural sector; Agricultural input suppliers: SWAVET, AGRA, Farmer's organization: Namibia National Farmers Organisation, Namibia Agricultural Union, Emerging Commercial Farmers Union, Agricultural Boards: Meat Board and Agronomic Board. Technology and data: Students are assigned project leaders to provide guidance on task inputs, such as technology, systems, and institutional framework. Data collected for the analyses, Analysis and discussion of the approach followed, findings, and application towards improvements.

Student Assessment Strategies
- Attendance registers for all students registered for the module quizzes 60%, and oral participation during guest lectures (40%).
- No exam will be required, the CA mark equals the final mark to obtain a minimum final mark of 50%.

YEAR 3 SEMESTER 1

F3751EP AGRICULTURAL PRICE ANALYSIS AND FORECASTING

Module Title:	AGRICULTURAL PRICE ANALYSIS AND FORECASTING
Module Code	F3751EP
NQF Level	7
Notional Hours	180
Contact hours	L:4h/w, P:3h/w, T:0h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	18
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
The role of price: Understanding the role of agricultural prices by looking at fixing standards of value; organising production; distribution of production; short-run rationing of products; providing for economic maintenance and growth. Price determination versus price discovery: Concept of price leadership; Correcting for inflation – the use of index numbers by understanding (the importance and limitations of the base year in index number; Deflating prices to adjust for inflation; Price movement over time; Analysis of trends: selecting a period for trend analysis and fitting trends; Simple linear regression and the estimation of trend. Price Cycles: Measuring cycles using trend, Measuring cycles using Moving Averages. Concept of Seasonality, Measuring seasonality using the simple average approach and moving average approach; Supply and demand relationship; Agricultural Commodity Balance sheet; Exchange rate effects on agricultural parity pricing; Computer usage and application to pricing analysis

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3751EE ECONOMETRICS FOR AGRICULTURAL ECONOMISTS

Module Title:	ECONOMETRICS FOR AGRICULTURAL ECONOMISTS

Module Code	F3751EE
NQF Level	7
Notional Hours	180
Contact hours	L:4h/w, P:0h/w, T:5h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	18
(Co-requisites)	
Prerequisite	F3532AS: Introduction to Statistics
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Definition of Econometrics: Economic and econometric models. Statistical Background: Probability random variables and probability distributions. Simple Regression: Specification of the relationships; method of moments; method of least squares; statistical inference in the linear regression model; analysis of variance for the simple regression model. Multiple Regression: importance of multiple regression; model with two explanatory variables; Statistical inference in the multiple regression model; Interpretation of the regression coefficients; Partial correlations and multiple correlations; Analysis of variance and tests of hypotheses; Degrees of freedom and R-squared; Tests for stability; The LR, W, and LM tests. Diagnostic tests: Violation of the assumptions of the basic regression model; Heteroskedasticity, Detection and consequences, and Solutions to the heteroscedasticity. Autocorrelation: identification of the autocorrelation problem; using the Durbin–Watson test, estimation in levels versus first differences. Multicollinearity and its definition: measures, the problem of, and solutions to the multicollinearity. Panel data analysis: longitudinal and cross-sectional observation data.

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain examination admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3751EM ECONOMIC METHODS FOR AGRIBUSINESS

Module Title:	ECONOMIC METHODS FOR AGRIBUSINESS
Module Code	F3751EM
NQF Level	7
Notional Hours	160
Contact hours	L:4h/w, P:0h/w, T:3h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content
The food sector: Overview, market size, and outlook; Key market players; Competitive landscape; Market risks, Market drivers; Industry challenges. Food supply chain: Farm inputs; Farm production; Logistics trade and distribution; Processor; Wholesale and trader; Food retail and services. Agro-technology: Modern techniques discussed such as farm machines, crop sensors, use of GPS, in fields documentation, Ethics in production: biotechnology; genetic manipulation, intensive tillage, monoculture, use of synthetic fertilizers, irrigation technologies, chemical pest control; Future of agricultural technology. Data collection: List of different stakeholders, approaches to obtain data, merging of information sources, summarising of information for trend analysis, presentation of data. Precision agriculture and smart farming: Best practices, efficiently utilising geographical information systems (GIS), soil maps, drones to modify agriculture, ways to improve precision farming, artificial intelligence (AI), future of smart farming, the significance of smart farming.

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

YEAR 3 SEMESTER 2

F3752EE ENTREPRENEURSHIP

Module Title:	ENTREPRENEURSHIP
Module Code	F3752EE
NQF Level	6

Notional Hours	160
Contact hours	4 Online lectures, P:0h/w, T:2h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

This course introduces students to the theory of entrepreneurship and its step-by-step practical implementation. it focuses on the theory of entrepreneurship; meaning, the importance of entrepreneurship, concepts, characteristics, classifications of entrepreneurship, problems faced by entrepreneurs in Namibia, entrepreneurial process; critical factors for starting a new enterprise, evaluating opportunities for new businesses, determining resource needs, and acquiring resources; business model; the revenue model, the cost model, formulating a winning strategy, the people are what matters- entry strategy- growth strategy; entrepreneurial marketing; marketing considerations- selecting the target market, market strategy. pricing strategies and marketing of services, export marketing; financing entrepreneurial ventures; sources of finance: debt and equity; entrepreneurial growth; transition from start-up to growth, the growth process, and execution; intellectual property rights by understanding the mandates of BIPA; copyrights, trademarks, trade secrets, patents, licensing; business planning process under Namibian regulations; planning process, business plan; accounting for agri-business enterprises; basic financial statements, managing cash flows, preparation of projected financial statements, applications of business ratios, small business management as well as strategies that improve performance of new business ventures; production and material, human resources, finance management, break-even analysis, operational cycle.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course

F3752EA AGRICULTURAL MARKETING

Module Title:	AGRICULTURAL MARKETING
Module Code	F3752EA
NQF Level	6
Notional Hours	140
Contact hours	4 Online Lectures, P:0h/w, T:2h/w + 1 T / w
Additional learning requirements	Field Trips
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

This course introduces the basic concepts in marketing theories and places them in the unique context of food and agricultural processing, distribution, wholesaling, and retailing, where discussion of markets are integrated with business marketing principles and strategy. This course will cover the following topics: the evolution of general marketing; marketing theory; evolution of agricultural marketing; overview of agricultural marketing; characteristics of agricultural produce; objectives of agricultural marketing; market and market components; market classifications; approaches to the study of marketing; Marketing Functions; grading and standardisation; labelling; branding; marketing channel for agricultural commodities; the elements of successful marketing channels; marketing channel roles; marketing channel power; demand and sales forecasting; market demand; sales forecast; agricultural commodity pricing and pricing policies; objectives of pricing; pricing strategy; pricing policy (pricing methods); break-even analysis; consumer or buyers behaviour; the consumer buying behaviour process; marketing mix; marketing mix elements; agricultural marketing research; types of marketing research; marketing research process; marketing strategy; marketing communications; developing of marketing plan; steps for creating a marketing plan; marketing strategy and tactics; horizontal and vertical integration of agricultural industries; types of vertical integration; determinants of horizontal and vertical integration; backward vertical integration; vertical integration and product differentiation; agricultural future market; farmer's contracts; hedging concept; and agricultural supply chain in Namibia; supply chain actors; agricultural supply chain; roles of agricultural boards (Namibia agronomic board and meat board) and farmer's organisation in agricultural marketing.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).

- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F3752ER AGRICULTURE AND RURAL DEVELOPMENT

Module Title:	AGRICULTURE AND RURAL DEVELOPMENT
Module Code	F3752ER
NQF Level	7
Notional Hours	160
Contact hours	4h Online lectures/w; T:1h /w
Additional learning requirements	Group work and projects
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Development theory and growth strategies: Models of development and underdevelopment, theories of economic development, human capital, rural-urban migration. Defining and measuring economic development: SDGs, HDI, Inequality and poverty measurements. International Policies: Trade and development, the balance of payments, trade policies, negotiations, financial markets, debt crisis, sources of finance, and financial markets. Rural development models and their importance: Drivers of food security and insecurity, rural poverty and deprivation (access to services e.g. education, health, water, sanitation) rural unemployment, land reform, and resettlement. Agricultural development: Theories and strategies for agricultural development, gender roles in relation to agriculture, the contribution of agricultural technologies, Research, extension, education, labour markets, input and credit markets, pricing policies, and marketing systems. Agricultural transformation and rural development in the 4IR

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

E.2.1.2 BACHELOR OF SCIENCE IN ANIMAL SCIENCE HONOURS (NEUDAMM CAMPUS) (31BSAS)

ADMISSION REQUIREMENTS

To be admitted into the **Bachelor of Science in Animal Science Honours**, a candidate should have obtained the following grades at NSSCAS/NSSCO level, or equivalents from a recognized qualification:

1. Subject to School Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Science in Animal Science Honours** shall be:

(i) A pass in five different subjects as follows:
(a) 2 subjects on NSSCAS level and obtained a "d" or higher, including Mathematics and at least any one of Biology or Agriculture.
(b) 3 subjects on NSSCO level with a C or higher, and should include Mathematics and at least any two of Biology, Agriculture or Physical Science (Physics/Chemistry).
(c) English must be at minimum C grade on NSSCO level

Or

(ii) A pass in five different subjects as follows:
(a) 3 subjects on NSSCAS level with a "d" or higher, including Mathematics and at least any two of Biology, Agriculture or Physical Science (Chemistry/Physics)
(b) 2 subjects on NSSCO level with a D or higher, including Mathematics and at least any one of Biology or Agriculture.
(c) English must be at minimum C grade on NSSCO level

2. For applicants with school leaving certificates obtained prior to 2021, the requirements of the UNAM admission, students' recruitment and registration policy will apply: Subject to School Special Regulations, the normal basic requirement for entrance to the Bachelor of Science in Animal Science Honours shall be:

(iii) A pass in five different subjects as follows:
(a) 2 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 3 subjects on ordinary level (NSSCO) with a C or higher in Mathematics and Biology, and at least a "D" symbol in either Physical Science, Chemistry or Physics
(c) English must be at minimum C at NSSCO level

Or

(iv) A pass in five different subjects as follows:
(a) 3 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 2 subjects on ordinary level (NSSCO) with a D or higher symbol in either Physical Science, Biology, Chemistry or Physics.
(c) English must be at minimum C at NSSCO level.

PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisites)/ Pre-requisites	Contact hours per week (L/P/T)
Year 1 Core Semester						
U3583AL	Academic Literacy I	5	8	C	None	40 hours
U3403FS	Skills Portfolio	4	0	C	None	
U3583DD	Digital Literacy	4	8	C	None	Sem 0: 4hr/wk Sem 1: 2hr/wk Sem 2: 2hr/wk
F3500ZI	Issues in Agriculture	4	4	E	None	20 hr
F3500ZP	Basic Programming with Python	5	4	E	None	20 hr
Total Credits Core Semester			24			
Year 1 Semester 1						
F3511AB	Introduction to Biochemistry	5	14	C	None	L (4h/w) P (3h/w)
F3531AR	Introduction to Range Management	5	14	C	None	L (4h/w) P (3h/ w)
F3551AA	Animal Anatomy & Physiology	5	14	C	None	L (4h/w) P (3h/w)
F3531CA	Mathematics for Agriculture	5	12	C	None	L (4h/wk) T (3h/w)
Total Credits Semester 1			54			
Year 1 Semester 2						
F3532AG	Molecular Genetics	5	14	C	Introduction to Biochemistry	L (4h/w) P (3h/w)

F3512AL	Livestock Production Systems	5	14	C	None	L (4h/w) P (3h/w)
F3502AF	Introduction to Fodder Production	5	7	C	None	L (2h/w) P (2h alt w)
F3522AM	Principles of Microbiology	5	8	C	Introduction to Biochemistry	L (2h/w) P (3h/w)
F3532AS	Introduction to Statistics	5	12	C	None	L (4h/w) T (3h/w)
Total Credits Semester 2			55			
Total credits Year 1			133			

Year 2 Core Semester						
U3683AL	Academic Literacy II	6	8	C	None	40 hours
U3520LP	Leadership Skills	5	2	C	None	10 hours
U3420CN	National and Global Citizenship	4	2	C	None	10 hours
U3420EM	Ethics and Morality	4	2	C	None	10 hours
F3610ZR	Introduction to Statistical Programming with R	6	8	C	None	40 hours
F3683AF	Farm Duties for Animal Scientists	6	2	C	None	10 hours
Total Credits Core Semester			24			
Year 2 Semester 1 (49-56 credits)						
F3611AB	Biochemistry	6	16	C	Introduction to Biochemistry	L (4h/w) P (3h/w)
F3601AP	Field Attachment for Animal Scientists Preparation	6	8	C	None	L (2h/w)
F3631AR	Animal Reproduction and Biotechnology	6	15	C	Animal Anatomy & Physiology	L (4h/w) P (3h alt w
F3611AE	Principles of Economics	6	14	C	None	L (4h/w) T (2h/w)
Total Credits Semester 1			54			
Year 2 Semester 2						
F3612AN	Animal Nutrition	6	15		None	L (4h/w) P (3h alt w)
F3632EE	Agricultural Extension and Group Dynamics	6	14	C	None	L (4h/w)
F3612EF	Farm Management	6	14	C	None	L (4h/w) T (2h alt w)
F3602AG	Game Ranching	6	9	C	None	L (2h/w) P (2h/w)
Total Credits Semester 2			51			
Year 2 Total Credits			129			
Year 3 Core Semester (24 credits)						
F3783AA	Field Attachment for Animal Scientists	7	24	C	Field Attachment for Animal Scientists Preparation	Four months Continues in Semester 1
Total Credits Core Semester			24			
Year 3 Semester 1						
F3711AP	Animal Science Practices and Equipment [Block teaching]	7	18	C	None	P (4h/w)
F3731AE	Entrepreneurship [Online]	7	16	C	None	L (4h/w) T (2h/w)
F3751AW	Farm Animal Welfare [Online]	7	16	C	None	L (4h/w) T (2h/w
Total Credits Semester 1			50			
Year 3 Semester 2						
F3712AH	Animal Health	7	18	C	Animal Anatomy & Physiology	L (4h/w) P (3h alt w)
F3732AA	Animal Breeding	7	18	C	Molecular Genetics	L (3h/w) P (3h/w

F3712CB	Biometry	7	16	C	Introduction to Statistics	L (4h/w) T (2h/w)
Total Credits Semester 2			52			
Year 3 total credits			126			
Year 4 Core Semester (22 credits)						
F3880AD	Design thinking	8	8	C	None	
F3880AP	Research proposal	8	14	C	None	
Total Credits Core Semester			22			
Year 4 Semester 1 (45-50 credits)						
F3883AR	Research Project*	8	16	C	Biometry	
F3801AM	Meat Science and Animal Products	8	10	C	None	L (2h/w) P (3h alt w)
F3811AB	Beef Production	8	20	C	None	L (4h/w) P (3h/w)
F3831AP	Range Management	8	20	C	Introduction to Range Management	L (4h/w) P (3h/w)
Total Credits Semester 1			50			
Year 4Semester 2						
F3883AR	Research Project*	8	16	C	Biometry	
F3802AD	Dairy Production	8	10	C	None	L (2h/w) P (3h/w)
F3812AS	Small Ruminant Production	8	20	C	None	L (4h/w) P (3h/w)
F3832AM	Monogastric Animal Production	8	20	C	None	L (4h/w) P (3h/w)
Total Credits Semester 2			50			
Year 4 total credits			138			
TOTAL CREDITS FOR THE PROGRAMME			526			

*Year module with 16 credits

MODULE DESCRIPTORS

FIRST YEAR

U3583AL ACADEMIC LITERACY I

Module Title: **ACADEMIC LITERACY I**
Module Code U3583AL
NQF Level 5
Notional Hours 80
NQF Credits 8
Prerequisite None
Contact Hours Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Compulsory/Elective Compulsory
Semester Offered 0,1&2

Module Content
The module will cover study skills, reading, listening, speaking and writing, referencing, language usage and text organization.

Student assessment strategies
Assessment will be based on Continuous Assessment.

U3403FS SKILLS PORTFOLIO

Module Title: **SKILLS PORTFOLIO**
Module Code U3403FS
NQF Level N/A
Notional Hours N/A
Contact hours N/A
Additional learning requirements None
NQF Credits NCB
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered Core Semester, Semesters 1 & 2

Module Content
UNIT 1: **Academic Planning and Goal Setting**

Individual Needs and Values; Steps in Reaching a Personal Vision; Proactive Approach Towards Learning; Self-Regulated Learning; Personal and Academic Goal Setting; Receptiveness to Learning; Exploring Self- Development and Self- Awareness.

UNIT 2: Attitude and Motivation

Understanding Motivation; Personal Attitudes, Behaviors and Interests; Self-Reflective Process; Approaches to Dealing with Negative Factors; Class Attendance and Participation; Procrastination; Self-Reliance; Discipline; Accountability; Healthy Habits.

UNIT 3: Learning styles

Understanding Personal Approaches to Learning; Dynamics of The Learning Process; Learning Styles and Strategies.

UNIT 4: Study Methods and Skills

Study Habits and Strategies; Learning Styles and Techniques; Effective Study Methods and Skills; Note Taking; Memory and Reading Skills; Critical Thinking.

UNIT 5: Time Management

Effective Time Management; Planning; Decision-making; Prioritization; Setting Boundaries; Time for Self – care; Procrastination.

UNIT 6: Assessment Preparation

In class exercise; Test and Examination preparation; Organizing academic workload; Setting daily study goals; Staying physically active; Study groups.

UNIT 7: Mental well-being

Understanding mental health; Signs and indicators of poor mental health; commonly experienced mental health challenges; psychosocial stressors; Seeking professional help; Coping strategies.

UNIT 8: Interpersonal Communication

Effective Communication Skills; Verbal and Non-Verbal Communication; Listening Skills; Problem Solving; Assertiveness; Negotiation Skills; Practicing Empathy in Communication; Self-Confidence; Receptiveness to Feedback; Building Trust; Teamwork; Leadership; Public Speaking Skills.

UNIT 9: Financial matters and management

Financial Literacy; Budgeting; Available Finance Options and Assistance; Managing Financial Resources.

UNIT 10: Student Violence

Types of Violence; Individual Roles in Violence; Myths, Forms; Consequences of Violence; Prevention Measures; Seeking for Help.

UNIT 11: Career Planning and Development

Defining and Selecting Career Goals; Career Exploring Different Strategies; Soft Skills Training.

Student Assessment Strategies

100% continuous assessment

Reflective journal on each unit (portfolio)

U3583DD	DIGITAL LITERACY
Module Title:	**DIGITAL LITERACY**
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content

Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites

Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time

Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues

Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia

Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings

Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks

Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog)
Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Student Assessment Strategies

1. Collaborative assessment tasks
1.1 Digital productivity: cloud based collaborative digital media creation using cloud platforms
1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing
2. Individual assessment tasks
2.1 Assignment: information literacy assignment
2.2 Test x 2
3. Practical
3.1 Digital proficiency
3.2 Data and Media literacy

No written examination

F3500ZI ISSUES IN AGRICULTURE

Module Title:	**ISSUES IN AGRICULTURE**
Module Code	F3500ZI
NQF Level	5
Notional Hours	40
Contact hours	20 Contact hours
Additional learning requirements	Field trips, Seminars and guest lectures
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module content

Agriculture: Agriculture as important economic sector; Population dependence on agriculture for their livelihoods. Production systems: Production systems and production sustainability. Land tenure systems: freehold and customary tenure. Agricultural Opportunities and Restrictions: such as the veterinary cordon fence; financial collateral; and the greed in the commons. The Namibian market driven economy and agricultural contribution: Agricultural practices; Resilience of livelihoods to withstand challenges posed by climate change; land scarcity, water; drought management relation to climate change; Cause and consequences of the supply chain of agricultural sub-sectors. Overview of sub-sectors and their value chains: cattle; sheep and goats; pigs; dairy; poultry; agronomy; horticulture; game and bio-mass. Niche markets: such as Swakara and Ethical issues of Genetically Modified Organisms (GMO's) and implications to food production systems; use of examples to demonstrate how a society use result into different externalities to balance policy intervention.

Student Assessment strategies

1. Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments and practical reports (at least 4 gradable items).
2. A continuous assessment mark of at least 50% is required to gain exam admission.
3. One examination with minimum duration of 3-hours (50% of the final mark).
4. A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
5. A final mark of 50% is required to pass this course

F3520ZP BASIC PROGRAMMING WITH PYTHON

Module Title:	**BASIC PROGRAMMING WITH PYTHON**
Module Code	F3520ZP
NQF Level	5
Notional Hours	20
Contact hours	One practical session every week for the duration of CS1
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module Content

Python installation; Anaconda. Data Structures and their operations; Variables; Strings; numeric variables; Lists. Control Flow; if, else and elif statements. Functions; How to use basic functions; Numpy Arrays. Pandas; Series; DataFrames. Interaction with OS; Reading and Writing files. Data Visualization; histograms; line and scatter plots.

Student Assessment Strategies
Student assessment will be based on formative assessment only through 100% continuous assessment. The assessment comprises 1 programming assignment. A minimum mark of 50% is required pass the module.

F3511AB	INTRODUCTION TO BIOCHEMISTRY
Module Title:	INTRODUCTION TO BIOCHEMISTRY
Module Code	F3511AB
NQF Level	5
Notional Hours	140
Contact hours	04 Lecture hours / week; 3 Practical hours / week for one semester
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
The scientific method and basic methods in Biology and Biochemistry:
Microscopy, scientific drawings, scientific method and writing of scientific reports. Biological foundation:Taxonomy and binomial nomenclature; Overview of the five major kingdoms of organisms and viruses; Overview of Phylum Chordata; Introduction to cellular respiration and photosynthesis; Chemical basis of life, Introduction to the structure of macromolecules or biomolecules. Cellular foundation:Cells as functional units of living organisms; prokaryotic and eukaryotic cells; ultra-structure of plant and animal cells, membrane structure and function, cell communication; cell cycle and cell death; cell division – mitosis and meiosis; molecular organization of genomes (prokaryotic and eukaryotic); source of energy and biosynthetic precursors.Chemical foundation:Atomic structure and the Periodic table; Electron configuration; Average Atomic Mass. The Mole Concept; Lewis structures; Introduction to organic chemistry: organic compounds.Biochemistry foundation:Acids, bases, buffers, pH, ionic strength, molarity; water (structure and ionization); Functional groups; Classes of hydrocarbons: alkanes, cycloalkanes: alkanes; alkenes and alkynes. Genetics foundation:DNA as the genetic material, genes and chromosomes, genomes, Mendelian genetics - monohybrid and dihybrid crosses, Aneuploidy and non-disjunction, genotypes and phenotypes, introduction to extensions of mendelian analysis, chromosome theory of inheritance, mutations, Introduction to linked genes and sex linkages.

Student Assessment Strategies
Continuous Assessment consists of 50% comprising of 2 tests, at least 3 marked practicals, quizzes / Assignment and a three-hours examination that constitutes 50% of the final grade. Pass mark for the module is 50%.

F3531AR	INTRODUCTION TO RANGE MANAGEMENT
Module Title:	INTRODUCTION TO RANGE MANAGEMENT
Module Code	F3531AR
NQF Level	5
Notional Hours	140
Contact hours	4 x 1-hour Lectures / week for 12 weeks; Practicals: 1 x 3 hours practical/week for one semester.
Additional learning requirements	Compulsory excursions; practicals; attachments / group work / project
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Rangeland ecology: Concept and Terminology of Ecology; Taxonomy of grasses; The Natural Ecological Cycles: Hydrological cycle; Carbon cycle; Nitrogen cycle; Phosphorous cycle; Morphology of grasses: Plant parts; Erect growth morphology; Stoloniferous grass morphology; Rhizomatous morphology; Ontogeny of Grasses: Seed germination; Vegetative grass growth; Reproductive growth; Tiller development; Factors affecting tillering; Growth of Woody plants: Plant photosynthesis; The basic mechanism of photosynthesis; Factors controlling photosynthesis; Plant water relations: Cell water relations; Water uptake; Transpiration; Environmental factors affecting transpiration; Nutrient acquisition by plants: Nutrient uptake by roots; The development of plant communities: Plant Succession – primary and secondary succession; Clements' stages of succession; Identification of the major forage species: Grasses; Legumes; Bush, shrubs and trees; Grazing value and ecological status of grasses: Palatability; digestibility; Increasers; Decreasers; Veld types in the farming areas of Namibia: Rainfall map; Soil types of Namibia; Agro-ecological zones; Biotic and abiotic factors affecting rangelands, Effect of climate change on rangeland condition and its mitigations; Introduction to rangeland restoration; Sustainable range management in Namibia.

Student Assessment Strategies
Continuous Assessment: 50% (2x assignments + 2 tests + at least 4 marked practicals).
Exam: 50% (1 x2 hr paper).

F3511AA	ANIMAL ANATOMY AND PHYSIOLOGY
Module Title:	ANIMAL ANATOMY AND PHYSIOLOGY
Module Code	3511AA
NQF Level	5
Notional Hours	140
Contact hours	Lectures: 4 hours per week; 3 hours Practicals every alternate week for one semester
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
The module deals with the concepts pertaining to the morphology function of the circulatory, respiratory, nervous, skeletal and locomotory systems of farm animals (ruminants, mono-gastric animals, and poultry). The anatomical and functional interrelationship of these systems and their embryonic development with special reference to their progenitors and derivatives are discussed. Practical classes that involve the use of carcass dissections, examination of internal organs in dead animals, and the study of laboratory models, help in the understanding of theoretical concepts discussed in the lectures.

Student Assessment Strategies
Continuous Assessment: 50% (1 x assignment; 2 tests; 2 quizzes and 3 x Practicals).
Exam: 50% (1 x 3 hour-paper)
Learning and Teaching Enhancement Strategies
Internal and external moderation of exam paper and scripts, peer review of course outlines and teaching; student evaluation, regular review of course content, effective and efficient supervision and monitoring of assignments, tests and exams

F3531CA	MATHEMATICS FOR AGRICULTURE
Module Title:	MATHEMATICS FOR AGRICULTURE
Module Code	F3531CA
NQF Level	5
Notional Hours	120
Contact hours	4 Lecture hours per week per semester; 4 Tutorial hours per week per semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
Ratios and Proportions: Share a given quantity in a specified ratio; and Use proportion to scale down or scale up quantities given a specific rate. Mathematics applications in agriculture: Calculation of various fertilizer contents; application rates; conversions in foreign markets; areas and volumes of various shapes; figures and Interest rates calculations Sets: Definition of a set; notation; equality of sets; subsets; characterization of equality via the subset relation; empty set; Venn diagrams; intersection; union; complement; proofs of simple results on set equality. Standard examples of sets: natural numbers; integers; rationals; real numbers. Cardinality of sets (examples of finite; infinite; countable; uncountable sets). Matrix Algebra: Matrices and vectors; principle of matrix multiplication; determinants; minors; cofactors and; transpose matrix; the cofactor matrix; adjoint and inverse; Cramer's rule; Solution of systems of equation; Gauss-Jordan elimination. Functions: Definition of function; Linear and non-linear function; selected nonlinear functions (exponents; and logarithms) and application in the biological field. Calculus: Differentiation and Integration of basic functions. Optimization: Review of inequalities; Linear; constrained and non-constrained problems: Review of series: Binomial and Geometric; factorial and summations notations.

Student Assessment Strategies
- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination 50% (1 x 3 hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3512AG	MOLECULAR GENETICS
Module Title:	MOLECULAR GENETICS
Module Code	F3512AG
NQF Level	5
Notional Hours	160
Contact hours	04 Lecture hours / week; 3 Practical hours / week for one semester
Additional learning requirements	None
NQF Credits	16

(Co-requisites)
Prerequisite Foundations to Biology and Biochemistry
Compulsory/Elective Compulsory
Semester Offered 2

Module Content
This course introduces and presents principles and methods used in the study of genetics. The emphasis is on application of concepts to solve problems. The course provides a foundation for more advanced studies in the field of agriculture. The specific topics to be covered are:
The molecular structure of nucleic acids (DNA and RNA) and gene expression: The double helix model of DNA; Transcription, Translation and the Genetic Code; Regulation of gene expression – the Lac operon; DNA replication in prokaryotes and eukaryotes.
Extension of Mendelian analysis and ratio: Incomplete dominance; co-dominance; multiple allelism; gene interactions (pleiotropy, epistasis, lethal genes); additive gene action.
Chromosomal basis of heredity: Physical structure of chromosomes and DNA Packaging; Karyotypes and Variations; gene linkage; genetic mapping.
Introduction to Quantitative Genetics: Introduction to population genetics
Other topics to be covered include: Molecular structure of genes; Mutations (types, causes, detection and significance); Sex determination; Sex linkage; sex-limited and sex-influenced.
The module also introduces students to molecular biology techniques: Genetic engineering or recombinant DNA technology; DNA extraction; Polymerase Chain Reaction (PCR); DNA electrophoresis and gene sequencing; gene cloning; animal cloning; markers (PCR-RFLP, Microsatellites & Minisatellites; PCR-SSCP, SNPs); marker-assisted selection as well as introduction to epigenetics.

Student Assessment Strategies
Continuous Assessment consists of 50% comprising of 2 tests, at least 4 marked practicals, quizzes / Assignment, group discussions and a three-hours examination that constitutes 50% of the final grade. Pass mark for the module is 50%.
Learning and Teaching Enhancement Strategies

F3512AL LIVESTOCK PRODUCTION SYSTEMS

Module Title: LIVESTOCK PRODUCTION SYSTEMS
Module Code F3512AL
NQF Level 6
Notional Hours 140
Contact hours 4 x 1-hour Lectures / week; 03 Practical hours per week for one semester
Additional learning requirements Excursions; group work
NQF Credits 14
(Co-requisites)
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 2

Module Content
Structural changes in the global livestock sector: drivers of change; impacts of changes; Climate change and livestock: impacts, adaptation and mitigation; The livestock industry in Namibia: contribution of livestock to sustainable agricultural development; livestock value chains; key lessons to learn from Botswana and Namibia export-oriented livestock industries; marketing of livestock; Systems of production: classification criteria; traditional and modern production systems; systems of beef production; Livestock management facilities: basic rules to maintain good housing; design considerations for farm buildings; Adaptive and productive components of productivity of livestock in the tropics: thermal equilibrium; heat load; heat dissipation; reducing heat load; effects of heat stress; reducing heat stress. Management of cattle: characteristics of Bos indicus and Bos taurus cattle; effects of environment and genotype on livestock production; Ruminant nutrition: nutrients; energy partitioning; digestion in cattle; Calf management: calf feeding; identification; dehorning; castration; vaccination; weaning; management of adult cattle; Health issues in livestock production: signs of good health; recognition of disease; disease prevention and control strategies; Management of pigs: bioeconomic traits; breeds and breed improvement; genetic defects; nutrition; losses that occur in pig enterprises due to poor management; external and internal parasites; infectious diseases; Sustainable livestock production: sustainable intensification; organic livestock production
Learning and Teaching Strategies/Activities
The module will be covered through a blend of lectures, practicals, excursions, case studies and projects. Some of the activities will be on individual basis, while others will be done as a group to encourage teamwork and facilitate learning. Students will do a SWOT analysis of a given livestock enterprise at Neudamm or Ogongo campus or other selected farm as part of a project.

Student Assessment Strategies
The assessment will include:
(a) Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
(i) Two tests (60% of CA mark)
(ii) Case study on livestock production enterprise (25% of CA mark)
(iii) Marked practicals/project (15% of CA mark)

(b) A 3-hour examination paper that will contribute 50 marks to the final mark.
(c) The final mark will be calculated as follows:
50% CA mark + 50% Exam mark = 100 % (final mark)

F3502AF	INTRODUCTION TO FODDER PRODUCTION
Module Title:	INTRODUCTION TO FODDER PRODUCTION
Module Code	3502AF
NQF Level	5
Notional Hours	70
Contact hours	2 x 1 hour Lectures / week; 02 Practical hours alternate weeks for one semester
Additional learning requirements	Compulsory field trips / excursions; Farm attachments / group work
NQF Credits	7
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester two

Module Content
Classification of Pasture and Forage Crops: Role of fodder crops in livestock production; Terminologies in Pasture and Forage Crops Production; Morphological characteristics of grasses, legumes, shrubs and trees. Types of Pastures: Temporary Pastures, Semi-Permanent Pastures, Permanent Pastures. Common Fodder Species in Namibia: Pasture grass species for different ecological zones; Herbaceous legumes for different ecological zones; Fodder trees. Pasture Species Selection Criteria: Adaptability – climatic & edaphic, Yield, Persistence, Ability to associate with other species, Ease of establishment (propagation). Pasture Seed Quality: Seed purity, Seed germination, Seed Scarification. Pasture grass and legume establishment & management: Land preparation, Fertilizer application, Legume seed inoculation, seeding rate and planting depth, Water/irrigation management, Weed management. Fodder trees establishment & management: Nursery establishment, Land preparation, Fertilizer application, seeding rate and planting depth, Water/irrigation management; Weed management. Feeding animals fodder crops: Harvesting techniques, Practical feeding strategies; Feed quality of pasture crops. Seed production of pasture species: Seed production systems opportunist & specialized), Harvesting & threshing methods, Seed drying techniques, Cleaning methods, Seed packaging & storage

Student Assessment Strategies
The hands-on assessment will include:
- Field practicals on fodder seed quality testing procedures, fodder establishment of grasses and legumes species, field conservation of fodder as hay and silage and nutritional analysis of conserved fodder, quality improvement of roughage feed resources such as cereal straws and hay done in groups.
- Seminar presentations of assigned research topics done in groups
- Oral tests done face to face on topics covered for that test
- Continuous assessment will contribute 40 marks (40%) to the final mark composed of:
- Two assignments (25% of CA mark)
- Four marked practicals (15% of CA mark)
- Two 2-hour tests (60% of CA mark)
- A 3-hour examination paper that will contribute 60 marks to the final mark.
- The final mark will be calculated as follows:
  50% CA mark + 50% Exam mark = 100 % final mark

F3502AM	PRINCIPLES OF MICROBIOLOGY
Module Title:	PRINCIPLES OF MICROBIOLOGY
Module Code	F3502AM
NQF Level	5
Notional Hours	80
Contact hours	2 hours lecture periods per week and 3 hours practical alternate week for one semester.
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	Foundations to Biology and Biochemistry
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Overview of Microbiology: Branches and history of microbiology; classification of microorganisms; microbial environments and interrelationships. Overview of Bacteria: Bacterial size, shape and arrangements; bacterial culture, media and streaking; microscopy and staining; control of microbial growth; chlamydia and rickettsia. Overview of Eukaryotic Organisms: General characteristics of algae, fungi and protozoa. Introduction to Virology: Salient features; bacteriophages. Role of microbes in soil, food and industry: microbes and bacterial use in various industries. Important pathogens of animals. Other topics: Preparation of media; culture of bacteria; staining and microscopic examination of bacterial cells; antibiotic sensitivity testing.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks.
Formative assessments will make up 50% of the module grade (i.e., 2 tests, at least 4 assessed practicals and 2 assignments and ad-hoc quizzes/tasks) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3532AS INTRODUCTION TO STATISTICS

Module Title:	INTRODUCTION TO STATISTICS
Module Code	F3532AS
NQF Level	5
Notional Hours	120
Contact hours	4 Lecture hours per week per semester 3 hour tutorial/Practical session per week per semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Introduction to statistics: Basic definition; role of statistics; branches of statistics – descriptive and inferential; basic statistical notations and symbols. Data types: Categorical versus discrete and Continuous versus numerical; Data sources: Primary versus secondary; Types of measurements: Nominal, ordinal, interval and ratio scales; Collection and presentation of data: Tabular forms; frequency tables, cross- tabulations (two variables), Graphical methods; bar charts, histogram, pie charts, frequency polygons, stem-and-leaf plots, box and whiskers plot, ogives; Identifying outliers; Measures of central tendency (grouped and ungrouped data case): Mean, median, mode, quartiles; Measures of dispersion: Skewness, measures of skewness and kurtosis; variance, standard deviation, range, inter-quartile range, coefficient of variation. Basic Set theory: Definitions, Venn diagrams, Distributive Law, De Morgan's Law; Counting techniques: permutation and combination; Probability: definition using relative frequency, properties; axioms of probability, random experiments, sample space and events, addition rule, mutually exclusive events, conditional probability, total probability, Bayes Theorem and independence; Random variables: expectations, random vectors, functions of random variables and probability density in discrete and continuous case; Probability distributions: Bernoulli; Binomial; Poisson; Geometric; Uniform; Normal, Binomial and Normal tables, Point estimation and confidence interval: CI for population mean and difference between two means for both large and small sample size case. Hypothesis testing: Formulation Single population mean, paired and independent samples for both small and large sample cases. Regression and correlation: Definitions, uses, SLR model assumptions, OLS technique, and model validation. Correlation analysis, scatter diagrams, Pearson's correlation coefficient, Spearman's rank correlation and the coefficient of determination.

Student Assessment Strategies
- Continuous assessment (at least 2 tests, 2 tutorial test and 2 assignments) 50%; Examination 50% (1 x 3 hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

SECOND YEAR

U3683LA ACADEMIC LITERACY II

Module Title:	ACADEMIC LITERACY II
Module Code	U3683LA
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact Hours	Semester 0: 4 hours/week Semester 2: 2 hours/week
Prerequisite	Academic Literacy I
Compulsory/Elective	Compulsory
Semester Offered	Core Semester,1&2

Module content
The module is designed for students enrolled in a bachelor's degree, which requires them to do basic research, read and listen to specific academic material, produce specific written texts and give academic presentations. The module thus, focuses on enhancing academic reading, academic vocabulary, writing, listening and speaking.

Student assessment strategies
The module will be continuous assessment based.
Assessment will include written tests, individual and group assignments, portfolio assessments and oral presentations.

U3520LP LEADERSHIP SKILLS

Module Title:	LEADERSHIP SKILLS

Module Code	U3520LP
NQF Level	5
Notional Hours	20
Contact hours	1 x 2h per week for 6 weeks
Mode of Delivery Blended:	Face to face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2

Module Content
Definition and scope of leadership; History and origins of leadership; Types of leadership; Leadership versus management skills; Leader (master of self, effective manager of people, active visionary); manager; Not all leaders are managers; Not all managers are leaders; Authority versus leadership; Power versus leadership; Principles of leadership (ability, adaptive, action, empowerment, creativity, problem solving, shared); Are leaders born or made?; Characteristics of a good leader; Functions of leaders in organizations; Leading for the future; Mentoring skills; The 21st century leader; Ethical leadership skills; Responsible leadership skills.
Learning and Teaching Strategies/Activities
The course will be facilitated through the following learning activities: face to face and online lectures, and tutorials.

Student Assessment Strategies
The module will be assessed using 100% continuous assessment.

U3420CN	NATIONAL AND GLOBAL CITIZENSHIP
Module Title:	NATIONAL AND GLOBAL CITIZENSHIP
Module Code	U3420CN
NQF Level	4
Notional Hours	20
Contact hours	Up to 1 contact lecture periods per week for 6 Weeks
Mode of Delivery Blended:	Face to face and Online
Additional Learning requirements	Each student will be required to work on a personal project which will include a site visit
NQF Credits	2
(Co-requisites)	
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
UNIT 1: Constitution and its Importance
What is a constitution; Functions of a constitution; What it contains; Constitution and democracy
UNIT 2: Global Citizenship
The meaning of global citizenship; Importance of global awareness; World issues of concern to global citizens.
UNIT 3: Civic Engagement
What do we mean by civic engagement; Dimensions of civic engagement; Indicators of civic engagement; Promoting civic engagement.
UNIT 4: Globalization
Understanding globalization; Cultural construction of neoliberal globalization; Major players; Major domains; Major Issues; Futures of Globalization
UNIT 5: Intercultural Communication
Dealing with difference; Levels of culture; Stereotypes and generalizations; Intercultural communication Processes
UNIT 6: Sustainable Development Goals and individual action Introduction to SDGs; Contributing to achievement of SDGs through action
Student Assessment Strategies
Continuous assessment of 100% - Assessment will be done by completing online pop-up quizzes; and developing their online portfolios of personal action as response to tasks assigned in class.

U3420EM	ETHICS AND MORALITY
Module Title:	ETHICS AND MORALITY
Module Code	U3420EM
NQF Level	4
Notional Hours	20
Contact hours	2 hours per week – supplemented by online learning
Mode of delivery Blended:	Face to face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	Core semester 1 or 2

Module Content
Theoretical approaches towards ethical decision making:
Ethical principles in perspective: Why is the principle of ethics necessary and significant? Ethics and the notion of ethical behavior related to value systems in the organizational setting in the 21stcentury. Fundamental ethical principles: Meta-ethics implies the nature of ethics and moral reasoning. Discussions and reasoning around the role of for example self-interest are examples of meta-ethical discussions. Normative ethics guides the individual on how to determine the content of moral behavior. Applied Ethics are related to specific realms of human action and how to address challenges within those realms. Psychological Egoism is a metaethical theory of motivation and related to self-interest and forms part of the first stage of moral development. Ethical egoism is a normative theory that states that our actions ought to be done from the perspective of self-interest. The moral concept of virtue and constructive evaluation of "virtue" ethics related to virtues found in a particular society or culture. Moral responsibility comprises of causality (cause and effect), knowledge (the facts, information and the skills acquired by the person through education or experience) and freedom (freedom of speech and acts). Applied ethics focusing on domain-specific areas for example science, health, business, education and engineering. Common ethical risks in personal life, studies and in the workplace that can lead to unethical behavior.

Student Assessment Strategies
100% Continuous Assessment

F3610ZR	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Title:	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Code	F3610ZR
NQF Level	6
Notional Hours	80
Contact hours	4 lecture periods per week and one 3hour practical per week for semester core
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	CS

Module Content
Learn how to navigate RStudio: how to load/save a file; load a package; access help. Examine the base R objects: vectors; matrices, arrays, lists, factors and tables; their respective characteristics, naming conventions and structures. Understand sub-setting, filtering and creation of these objects. Examine the implementation of control structures (loops and functions) in R. Investigate how R can be used for mathematical and statistical calculations. Data Cleaning and Manipulation in R: Lear how to manipulate and clean data in R; importing and exporting data from other statistical packages and data bases; aggregating data; reshaping data Visualisation (Packages): Learn how basic plots are generated in R – histograms; X-Y plots, bar charts; pie charts, scatter plot. Understand the ggplot2 package for advanced plotting; Statistical Testing: Understand how R can be for hypothesis testing. Investigate how R can be used in statistical modelling techniques (SLR)

Student Assessment Strategies
Continuous Assessment: 100 % (minimum of 2 tests (30%), 1 project assignment (presented in oral and written form, 40%), 3 marked practicals, 30%). The pass mark for the module is 50%

F3683AF	FARM DUTIES FOR ANIMAL SCIENTISTS
Module Title:	FARM DUTIES FOR ANIMAL SCIENTISTS
Module Code	F3683AF
NQF Level	6
Notional Hours	80
Contact hours	One full day (7-hour day) alternating weeks for CS, 1 and 2
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module content:
Content of all courses in degree programme is relevant for the hands-on farm duties. Students will undertake farm duties at Neudamm Campus involving all activities ranging from farm mechanizations, crop husbandry activities, animal husbandry activities and analysis of farm and financial records. Assessment will be based on attendance at different enterprises/units of the farm, participating in completion of tasks and attitudes toward work. Students on farm duties will be in the close supervision of the unit head or the teaching staff.

Student Assessment
Specific learning outcomes

Already listed Assessment tasks

1. Assessment will be based on attendance and participation on tasks at hand. Pass or fail grade. Pass with more than 80% attendance.

F3611AB	BIOCHEMISTRY
Module Title:	BIOCHEMISTRY
Module Code	F3611AB
NQF Level	6
Notional Hours	160
Contact hours	04 Lecture hours / week; 3 Practical hours per week for one semester
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	Introduction to Biochemistry
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Structural Biochemistry: Structure and function of macromolecules (carbohydrates, proteins and lipids), Vitamins, Coenzymes and Cofactors.
Enzymology: Enzymes as organic catalysts; Enzyme nomenclature; Factors affecting activities of enzymes; Enzyme kinetics - The Michaelis-Menten equation; The Lineweaver-Burk plot; Enzyme inhibition; Allosterism.
Bioenergetics and Thermodynamics: Free Energy, Laws of Energy, Activation Energy, Transition States, Endergonic and exergonic reactions.
Metabolism: Catabolism and Anabolism; Carbohydrate catabolism (Glycolysis, Alcohol and lactic acid Metabolism, Tricarboxylic acid cycle or the TCA cycle; Electron transport chain and oxidative phosphorylation); Regulation of carbohydrate metabolism; Gluconeogenesis; Synthesis of the disaccharides (lactose and sucrose); Lipid metabolism (β-oxidation, malonly CoA); Integration of carbohydrate and fat metabolism; Amino acids and protein metabolism; Urea cycle; The Cori cycle; Pentose phosphate pathway.
Spectrophotometry: Fundamental laws of spectrophotometry and absorbance, including calibration curve

Student Assessment Strategies

Continuous Assessment consists of 50% comprising of 2 tests, at least 3 marked practicals,
quizzes / Assignment and a three-hours examination that constitutes 50% of the final grade.
Pass mark for the module is 50%.

F3602AG	GAME RANCHING
Module Title:	GAME RANCHING
Module Code	F3602AG
NQF Level	6
Notional Hours	90
Contact hours	2 x 1-hour Lectures / week for 12 weeks; Practicals: 1 x 2 hours practical/weeks for one semester
Additional learning requirements	Practicals, compulsory field trips / excursions (outside the normal practicals); attachments / group work / project
NQF Credits	9
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Course content:

Wildlife in Namibia: Namibia – water, land use, wildlife numbers, economic returns; effects of climate change; value of wildlife in Namibia today and in the future; Conservation: key terms in wildlife conservation; conservation principles in terms of wildlife management, successful conservation, approaches to conservation, wildlife value; community involvement in successful conservation; relevant Namibian legislation; components of wildlife protection; components of wildlife biology and behaviour; habitat; range; management principles; population dynamics and monitoring; management styles; Game Ranching: four pillars of game ranching; nutrition management practices; Namibia's "Golden Opportunity"; Veld Management for Wildlife: types of vegetation occurring; land degradation; natural veld managers; ecological disturbance; grazing management practices; Disease Ecology: ecological; the Ecosystem; Ecosystem interferences; One Health: mitigation of effects of crises that originate at the interface between humans, animals and their various environments including antibiotic resistance ; Meat and trophy processing with special focus: on animal skinning, preparation of trophies & final trophy handling and, by-products.

Student Assessment Strategies

Continuous Assessment: 50% (2x assignments + 2 tests + at least 4 marked practicals).
Exam: 60% (1 x3 hours paper).

F3611AR	ANIMAL REPRODUCTION AND BIOTECHNOLOGY
Module Title:	ANIMAL REPRODUCTION AND BIOTECHNOLOGY

Module Code	F3611AR
NQF Level	6
Notional Hours	160
Contact hours	4 hours / week; 3 practical hours every alternate week for one semester
Additional learning requirements	None
NQF Credits	16
(**Co-requisites)**	
Prerequisite	Animal Anatomy and Physiology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Introduction content-Female and male reproductive systems and processes in farm animal, Poultry reproductive system, gamete and egg production; the oestrous cycles in large and small ruminants, oestrus synchronization in ruminants; hormones and hormonal utilization in the reproductive process of farm animals, superovulation, oocyte production and embryo collection in cattle; ova and sperm production: collection and evaluation, heat detection in ruminants; artificial insemination and uses in animal production systems; fertilization/conception and gestation in farm animals, diagnosis of pregnancies in farm animals, pregnancy durations and management in cattle, goats and sheep; overview of embryo growth and development in livestock; management of the gestation and parturition periods in farm animals; management of lactating farm animals; current advances in animal reproduction, induction of multiple ovulations in farm animals, embryo collection and transfer; selecting donor and surrogate animals for embryo transfer; theoretical aspects of cloning.

Student Assessment Strategies

Continuous Assessment will constitute 50% from at least 1 assignment; 2 tests; 2 quizzes; 3x 3 hour practical conducted over a period of 14 weeks; 3 hour examination will constitute 50% of the final mark.

F3611AE PRINCIPLES OF ECONOMICS

Module Title:	PRINCIPLES OF ECONOMICS
Module Code	F3611AE
NQF Level	6
Notional Hours	140
Contact hours	L:3h / w; P:0h/w, T:2h/w
Additional learning requirements	field trips
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

This module introduces a broad range of economic concepts, theories and analytical techniques. Basic Concepts of Economic:, Fundamentals principles of Economics, Production Possibility frontier, economic system; Demand and Supply: Law of demand and supply, determinants of demand and supply of agricultural commodities, market equilibrium, price control for agricultural markets, elasticity of demand and supply in agricultural market; Theory of Production: Production function, factors of production, production concepts and law of production; Cost Theory: short-run and long-run farming production costs, least cost combination and profit maximization in farming; Theory of consumer behaviour: Cardinal and Ordinal Utility, law of marginal utility, Utility Maximising; Theory of firm: agricultural market structures. Macroeconomics: macroeconomics concept; National Income Accounting; importance of national income accounting, measuring GDP and National income; Consumptions, Savings, and Investment: consumption, saving, and investment function; economic growth. Business cycles and Unemployment: business cycle phases; types of unemployment, inflation; Money and Banking: types of money, money supply, quantity theory of money; Government funding and Expenditure: Government spending, government Revenue-Taxation, Budget; Fiscal and Monetary policies; International Trade: comparative and absolute advantage, exchange rates and terms of trade in Namibia.

Student Assessment Strategies

Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments and practical reports (at least 4 gradable items).

1. A continuous assessment mark of at least 50% is required to gain exam admission.
2. One examination with minimum duration of 3-hours (50% of the final mark).
3 A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
4 A final mark of 50% is required to pass this course

F3612AN ANIMAL NUTRITION

Module Title:	ANIMAL NUTRITION
Module Code	F3612AN
NQF Level	6
Notional Hours	160
Contact hours	4 x 1-hour Lectures / week; 03 Practical hours alternate weeks for one semester

Additional learning requirements	Compulsory field trips / excursions; Farm attachments / group work
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Two

Module Content

Nutrient categories: The role of animal nutrition in animal production; Key concepts and terminology
Components of animal feeds: water, dry matter, organic matter, carbohydrates, proteins, lipids, minerals and vitamins. Feed resources classification: Roughages, concentrates, browse, mineral & vitamin supplements
Comparative nutritional values of different feedstuffs, Availability, affordability and laws associated with the use of either; Feed fractions and their nutritional implications; Feed additives - Objective of using additives; classification, and their role in animal nutrition, Forage conservation techniques and improving feeding value of low-quality feedstuffs. Laboratory feeds analysis: Proximate analysis, Detergent fibre analysis; Near infrared Reflectance Spectroscopy (NIRS), Anti-nutritive factors. Anti-nutritive factors: Classification/types (tannins, phenols, saponins, trypsin inhibitors etc.), Effects in animals, Reduction of ANFs methods. Feed energy & protein partitioning in livestock: Metabolisable energy (ME) system, Metabolisable protein (MP) system. Nutrient Digestion: Monogastric animals: poultry, pigs; Non-ruminant herbivores: horses, donkeys, Ruminant herbivores: cattle, goats, sheep; Digestibility techniques: In vivo, in sacco, In vitro digestibility and degradability experiments. Mineral and vitamin nutrition: Macro-minerals function, deficiency symptoms, sources; Micro-minerals function, deficiency symptoms, sources; Fat- & Water-soluble vitamins function, deficiency symptoms, sources. Feed processing & ration formulation: Feed processing: extrusion, grinding, cooling, crumbling, drying, & pelleting; Nutrient requirements of different farm animals; Significance and use of feeding standards; Ration formulation methods and feed mixing for different farm animals. Climate smart animal production: Livestock contribution to greenhouse gases (GHGs), Nutritional manipulation for reduction of enteric GHG emission, Methane & nitrous oxide mitigation strategies from livestock manure.

Student Assessment Strategies

The hands-on assessment will include:

- Field practicals on fodder conservation as silage, formulation of animal feeds and testing animal performance in the metabolism house, quality improvement of roughage feed resources such as cereal straws and hay done in groups.
- Seminar presentations of assigned research topics done in groups
- Oral tests done face to face on topics covered for that test

Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
Two 2-hour tests (60% of CA mark)
Two assignments (25% of CA mark)
Four marked practicals (15% of CA mark)
A 3-hour examination paper that will contribute 50 marks to the final mark.
The final mark will be calculated as follows:
50% CA mark + 50% Exam mark = 100 % final mark

F3632EE AGRICULTURAL EXTENSION AND GROUP DYNAMICS

Module Title:	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Code	F3632EE
NQF Level	6
Notional Hours	140
Contact hours	L:4h/w, P:0h/w, T:0h/w
Additional learning requirements	Group work
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Module Content

Extension concepts: Principles, principles and philosophies; compare Modern and Traditional Extension; introduction of the new extensionist. Trends in the extension sector: The focus on globalisation and pluralism; adult learning for behavioural change. Extension methods: group contact, individual and mass contact. ICT innovation: to emerging agricultural challenges faced by extensionist. Extension Approaches: Identifying and comparing agricultural extension approaches. Perception: theatrical background of farmers, attitudes and decision making. Programme Extension: understanding of leadership principles and leadership development in the community-run initiatives. Social change and innovation: attributes of Innovations and their rate of adoptions. Models of the communication: process; written communication news reporting articles and newsletters; setting up communication public speaking; non-verbal communication: Interpersonal communication and needs: definition and importance of group; the group as channel of communication; group formation and functioning; group techniques. Group norms and cohesion: group goals; group member's roles; behavior and attitude in a group; motivation of group.

Student Assessment strategies

1. Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments and practical reports (at least 4 gradable items).

2.. A continuous assessment mark of at least 50% is required to gain exam admission.
3. One examination with minimum duration of 3-hours (50% of the final mark).
4. A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
5. A final mark of 50% is required to pass this course

F3612EF	FARM MANAGEMENT
Module Title:	FARM MANAGEMENT
Module Code	F3612EF
NQF Level	6
Notional Hours	140
Contact hours	L:4h/w, P:0h/w, T:3h/Aw
Additional learning requirements	Individual assignments and projects
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Concepts of farm management and decision-making, acquisition and the use of farm records, depreciation methods and assets valuation, economic principles-choosing production levels, economic principles in choosing input and output relationship, cost concepts, various budgets, investment analysis, risk and uncertainty management, machinery management and human resource management.

Student Assessment Strategies
- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments and practical reports (at least 4 gradable items).
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F3601AP	FIELD ATTACHMENT FOR ANIMAL SCIENTISTS PREPARATION
Module Title:	FIELD ATTACHMENT FOR ANIMAL SCIENTISTS PREPARATION
Module Code	F3601AP
NQF Level	6
Notional Hours	80
Contact Hours	Lectures: 2 hours per week for one semester
Additional Learning Requirements	None
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
The importance of animal science knowledge and practice in industrial attachment: Guides on how to get specific job and skill experience during field attachment. Employability-enhancing activities: gaining workplace skills and building network of company or industry contacts. Professional behavior and/or knowledge: role and expectation of student in the workplace, acceptable workplace behaviors and specific common job norms. Guide on effectiveness of field-based learning. Demonstration and discussion of ethical awareness, the ability to do ethical reflection, and the ability to apply ethical principles in decision-making. Collaboration and teamwork in a work context. Preparation to be able to identify, comment on and relate organizational, scientific and technical knowledge based on the key activities, as may be applicable, at the company/institution where attached. Administration: Procurement procedures, adequate record keeping.
Personnel Health and safety, occupational health, dose exposures and risks assessments in workplace: Assess risks, hazards and exposures in the working environment. Student placement indemnity: The placement indemnity form is given to the students for signature, to prepare them for the field attachment in the following semester.

Student Assessment Strategies
Assessment for this module will consist of formative activities, and the final mark will be made of 100% Continuous Assessment (CA). The CA will be made up of seminars (30 %) and field-based learning plan (70 %).

THIRD YEAR

F3783AA	FIELD ATTACHMENT FOR ANIMAL SCIENTISTS
Module Title:	FIELD ATTACHMENT FOR ANIMAL SCIENTISTS
Module Code	F3783AA
NQF Level	7
National Hours	240

Contact hours	4-6 months from November/December to Semester one
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core and S1

Module content:
This is a practical module where students spend time at real work situations under the supervision of qualified personnel. The students are attached to suitable livestock related institutions and agricultural businesses. Students are engaged in activities such as: Animal management and handling: learn how to herd animals with minimal stress based on animal welfare regulations, learn how to handle animals prior and during animal husbandry procedures (castration, dehorning, ear tagging, vaccination, tail docking, teeth clipping, iron supplementation, milking, etc.) in accordance with animal welfare standards, learn how to carry out animal husbandry techniques, body condition score. Animal health: recognize and diagnose zoonotic and economic important diseases such as: anthrax, rabies, food and mouth disease, CBPP etc. and internal and external parasites, implementation of prophylactic disease control measures (e.g. isolation, quarantine, vaccination). Nutrition (feeds and feeding): common feeds, supplementary feeding, feeding at different stages of production, ration formulation and mixing. Rangeland management and assessment: management of rangeland, assess rangeland conditions, fodder production and conservation, effective drought preparedness plan, feeding for drought. Breeding and selection: selection and management of breeding stock, preparation for breeding seasons, breeding soundness evaluation, heat detection. Maintenance of farm infrastructure: Repair of fences, pipeline inspection and maintenance, cleaning of pens, farm buildings. Farm planning: planning for breeding season and activities, maintenance of appropriate herd structure, proper disposal of animal waste while reducing harm to the environment, fodder flow planning Administration and record keeping: procurement procedures, meticulous record keeping on all farm operation activities, input usage and outputs, animal records (performance, pedigree, health recording), weather data, regular periodic reports, learn how to properly record and capture data in farm performance registers (digitalized records, NAMLiTS system, transportation documents, permits. Marketing: marketing research, marketing plan development and evaluation, learn how to grade and classify products. Research: Design of experiments, data collection, analysis and writing up of research results, and any other duties as per respective institution.
During the attachment period University lecturers visit the students to engage with field supervisors and to ensure that students are at their attached places and doing practical work as prescribed.

Student Assessment Strategies
Assessment by Field Supervisor = 30%
Oral presentation = 20%
Written report = 50%

F3711AP ANIMAL SCIENCE PRACTICES AND EQUIPMENT

Module Title:	ANIMAL SCIENCE PRACTICES AND EQUIPMENT
Module Code	F3711AP
NQF Level	7
Notional Hours	180
Contact hours	7 hours practical per week for one month during the semester
Additional learning requirements	None
NQF Credits	18
(Co-requisites)	
Prerequisite	Year 1 and 2 modules
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Students will be divided into four groups of 6 students each. The practicals are divided into 4 clusters. Each of the following practical clusters is worth 4-5 credits and is for 9 hours:
Week 1:
(5 Credits) Dairy: Milking parlor operations (processing and storage; CMT); body condition scoring
Poultry production: Interpreting production figures; Basic hatchery operatives; feeding; brooding; biosecurity; health basics
Beef Production: Basic husbandry: - Castration and dehorning and vaccination cattle; branding (animal traceability; electronic ear tag or rumen bolus???)
Week 2:
(4 Credits) Rangeland: Carrying capacity estimation and stocking rate and veld condition assessment
Nutrition: Feed Formulation and Balancing (Cattle, small stock, poultry, pigs)
Piggery: Biosecurity; feeding; production plan
Week 3:
(4 Credits) Animal Products: Visit to a Tannery or other farm products processes at the farm
LPS: Design production calendar according to species or simulated scenario
Animal Welfare: Visit abattoir Neudamm or Meatco slaughter [canning??]
Week 4:

(5 Credits) Breeding & Genetics: Calculations and case studies; selection
Small stock: body score condition; deworming; vaccination
Business: Use specified data to make some decisions linked to farm management

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks.
Practical exercises 50%
Written Reports 30%
Written theoretical paper 20%

F3752EE ENTREPRENEURSHIP

Module Title:	ENTREPRENEURSHIP
Module Code	F3752EE
NQF Level	6
Notional Hours	160
Contact hours	4 Online lectures, P:0h/w, T:2h/w
Additional learning requirements	Individual assignments and projects
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
This course introduces students to the theory of entrepreneurship and its step-by-step practical implementation. it focuses on theory of entrepreneurship; meaning, importance of entrepreneurship, concepts, characteristics, classifications of entrepreneurship, problems faced by entrepreneurs in Namibia, entrepreneurial process; critical factors for starting a new enterprise, evaluating opportunities for new businesses, determining resource needs and acquiring resources; business model; the revenue model, the cost model, formulating a winning strategy, the people are what matters- entry strategy- growth strategy; entrepreneurial marketing; marketing considerations- selecting the target market, market strategy. pricing strategies and marketing of services, export marketing; financing entrepreneurial ventures; sources of finance: debt and equity; entrepreneurial growth; transition from start-up to growth, the growth process and execution; intellectual property rights by understanding the mandates of BIPA; copyrights, trademarks, trade secrets, patents, licensing; business planning process under Namibian regulations; planning process, business plan; accounting for agri-business enterprises; basic financial statements, managing cash flows, preparation of projected financial statements, applications of business ratios, small business management as well as strategies that improve performance of new business ventures; production and material, human resources, finance management, break even analysis, operational cycle.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments and practical reports (at least 4 gradable items).
1.. A continuous assessment mark of at least 50% is required to gain exam admission.
2. One examination with minimum duration of 3-hours (50% of the final mark).
3. A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
4. A final mark of 50% is required to pass this course

F3711AW FARM ANIMAL WELFARE

Module Title:	FARM ANIMAL WELFARE
Module Code	F3711AW
NQF Level	7
Notional Hours	160
Contact hours	4 hours lecture periods per week and 3 hours practical for one semester.
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction – Concepts of animal welfare. Five freedoms of life. Introduction to welfare assessment– behaviour, physiology and motivation, preference and aversion testing etc. Physiological indicators of welfare. Measurement of stress responses. Immune system function and welfare. Pathological effects of stress. Relationships between welfare indicators. Using a range of methods in combination to assess welfare. Review of studies comparing different conventional and alternative housing systems for farm livestock – their effects on health and welfare. Understanding of environmental factors affecting welfare – pen design, stocking density, safety aspects, building design. Problems associated with barren and enriched environments, social grouping and husbandry procedures. Methods of assessing and improving environments. Diseases related to animal housing– lameness in cattle, leg weakness in poultry,

wounding due to aggressive behavior in pigs and poultry. Specific problems of farm animals – identification of casualty animals, transport, slaughter. Effects of routine surgical procedures– castration, tail docking, beak trimming.

Student Assessment Strategies

Student assessment for this module will consist of formative and summative tasks.

Formative assessments will make up 50% of the module grade (i.e., 2 tests, at least 4 assessed practicals and 2 assignments and ad-hoc quizzes/tasks) and a summative assessment (end of semester examination) 50% (1x 2 hours theory paper). Pass mark for the module is 50%.

F3712AH	ANIMAL HEALTH
Module Title:	ANIMAL HEALTH
Module Code	F3712AH
NQF Level	7
Notional Hours	180
Contact hours	4 hours lecture periods per week and 3 hours alternate practical for one semester.
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	Animal Anatomy and Physiology
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:

Introduction: Concepts of animal health, disease development and control; nature of disease and body responses; types of immunities, Disease control: General knowledge of pharmacology and therapeutics concepts of vaccination and herd health; disease development and body responses in livestock; causative agents of disease; diagnosis of disease; Hygiene practices: Cleaning, disinfection, sanitation; Animal health management: Animal disease management, biosecurity measures, management of pregnant, lactating animals; wastes, carcasses disposal; Diseases and disorders of lactating cow: mastitis, udder edema, dystocia, milk fever, ketosis, and calves: pneumonia, diarrhea; poultry diseases; and swine diseases; Effect of environment on: animal function and performance; Animal housing requirements, Common notifiable diseases of cattle, sheep, goats, pigs, and poultry in Namibia. Practical classes: allow the participation of students in actual activities pertaining to animal health as performed by veterinarians and technicians on the farm; laboratory based practical lessons includes, examination of blood smears, pre-prepared slides of blood, tissue and saliva borne agents of disease.

Student Assessment Strategies

Continuous Assessment: 50% comprising 1 assignment, 2 tests, 2 quizzes, 10 practical sessions;
and a 3-hour examination constitutes 50% of the final grade.

A3712AB	ANIMAL BREEDING
Module Title:	ANIMAL BREEDING
Module Code	A3712AB
NQF Level	7
Notional Hours	180
Contact hours	3 x 1-hour Lectures / week for 12 weeks; 03 Practical hours per week for 12 weeks
Additional learning requirements	Excursions; group work; project; tutorials
NQF Credits	18
(Co-requisites)	
Prerequisite	Pre-requisites: Molecular Genetics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Review of Mendelian Genetics: Mendel's laws; linkage; sex determination; pleitropy; Modes of gene action: additive, dominance, epistasis; Introduction to Population Genetics: probability; Hardy-Weinberg law; forces that change gene frequency; Variation: continuous and discontinuous variation; metric characters; the normal distribution; genotype x environment interaction; Measures of association: correlation; regression; Partitioning quantitative variation into its causal components: genetic causes of variability; environmental cause of variability; breeding value; heritability; repeatability; Methods of estimating heritability: selection experiment; sib correlations; parent-offspring regression; High-low line separation; Correlation between traits: phenotypic correlation; genetic correlation; causes of genetic correlation; Principles of selection: factors that influence rate of selection gain; interaction of selection accuracy, selection intensity and generation interval; correlated selection response; Sources of information used in selection: individual information; ancestor information; collateral relatives; progeny information; Genetic evaluation and selection: Expected Progeny Differences (EPDs); breeding value estimation and associated accuracy with different sources of information; maternally influenced traits; BLUP; Inbreeding and relationship coefficients: path coefficient method; Tableau methods; Outbreeding: phenotypic effects; heterosis; types of heterosis; crossbreeding; Broad categories of commercial breeding programmes: commercial strait breeding; rotational crossbreeding; terminal sire systems; combination systems; composites; Dairy cattle improvement: procedures used to evaluate bulls; records kept; breeding strategies; nucleus breeding schemes; Beef cattle improvement: bioeconomic traits; Swine and poultry improvement: pyramid breeding structure; bioeconomic traits; Goat improvement: bioeconomic traits; Types of

genetic markers: RFLPs, microsatellites and SNPs; Molecular Genetics applications in animal breeding: halothane gene; Booroola fecundity gene; linkage disequilibrium; whole genome selection (WGS); commercial genetic tests; selection for disease resistance.

Student Assessment Strategies
The assessment will include:
Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
1. Two 2-hour tests (40% of CA mark)
2. Three assignments (15% of CA mark)
3. Three marked practicals (20% of CA mark)
4. One project (15% of CA mark)
5. Data modelling, analysis and interpretation (10% of CA mark)

A 3-hour examination paper that will contribute 50% to the final mark.
The final mark will be calculated as follows:
50% CA mark + 50% Exam mark = 100 % (final mark)

F3712CB	BIOMETRY
Module Title:	BIOMETRY
Module Code	F3712CB
NQF Level	7
Notional Hours	160
Contact hours	4 Lecture hours per week per semester 2 hour tutorial sessions per semester
Additional learning requirements	None
NQF Credits	16
(Co-requisites)/Prerequisite	Introduction to Statistics
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Experimental design: Basic experimental terms; Principles of experimental design; Types of designs CRD; RCBD; Latin Square; Factorial; Split plot; Split-split plot and Repeated Measures designs; one-way and two-way ANOVA; assumptions and ANOVA model diagnostic checks. Parametric and non-parametric tests: comparison between parametric and non-parametric tests; Non-parametric test- Goodness of fit and test of association; paired and independent test in non-parametric; Kruskal-Wallis test; Friedman and Runs test. Multivariate techniques: PCA; CA; Path Analysis; FA; Canonical Correspondence; multidimensional scaling and Genotype × environment Interaction Analysis. Response Surface Methodology: Central Composite designs and Box-Behnken designs. Multiple Linear Regression: MLR model; Analysis and building a MLR; testing the usefulness of the MLR model. Survey Methods: Sampling Frame; Modes of data collection; research designs; and questionnaire design and reliability analysis.

Student Assessment Strategies
- Continuous assessment (at least 2 tests; 2 tutorial test and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper).
- To pass this module a student must obtain a minimum final mark of 50%.

FOURTH YEAR

F3880AD	DESIGN THINKING
Module Title:	DESIGN THINKING
Module Code	F3880AD
NQF Level	8
Notional Hours	80
Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Student Assessment Strategies
- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F3880AP	RESEARCH PROPOSAL

Module Title:	RESEARCH PROPOSAL
Module Code	F3880AP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	F3712CB: Biometry
Compulsory/Elective	Compulsory
Semester Offered	0

Module Content
Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies
The assessment will include:
The module is based on 100% continuous assessment and the final mark will be calculated as follows:
- Module assessment quizzes (20%)
- Proposal report (50%)
- Proposal presentation (20%)
- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)

F3883AR RESEARCH PROJECT

Module Title:	RESEARCH PROJECT
Module Code	F3883AR
NQF Level	8
Notional Hours	160
Contact hours	N/A
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	F3712CB: Biometry
Compulsory/Elective	Compulsory
Semester Offered	Semesters 1 and 2

Module Content
The module is Research based. It includes writing of research proposal in Animal Science during the Core Semester in the fourth year and carrying out research under supervision of a Departmental lecturer, reviewing relevant literature on the topic under study, analyzing data and report presentation as well as research project write-up. Students should be able to utilize the plagiarism software and the plagiarism report Urkund is to be applied consistently in the Department

Student Assessment Strategies
The Research Project Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:
Research Proposal Presentation - 10%
Draft Project Proposal - 15%
Draft research report presentation - 20%
Final marked report - 50%
Final corrected report - 5%
A minimum mark of 50% needs to be achieved in order to pass the module.
Learning and Teaching Enhancement Strategies
The following initiatives have been proposed for assuring the quality of the programme
1. Engagement of Internal and External moderation of final research thesis for the students
2. Evaluation of draft report by more than one Lecturer
3. Student evaluation of teaching and materials
5. Effective supervision and monitoring of research activities

F3801AM MEAT SCIENCE AND ANIMAL PRODUCTS

Module Title:	MEAT SCIENCE AND ANIMAL PRODUCTS
Module Code	F3801AM
NQF Level	8

Notional Hours	100
Contact hours	03 Lecture hours / week; 2 Practical hours / week for one semester
Additional learning requirements	None
NQF Credits	10
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction: Importance of meat, livestock products and by-products, Muscle anatomy and physiology: anatomy of skeletal muscles; physiology of muscular contraction and relaxation; growth and carcass composition of meat animals; rearing animals for meat, milk, eggs, hide and skin on the farm; transportation of animals for slaughter; management of slaughter animals at feedlots; Slaughtering procedures: cattle, goats and sheep, pigs and poultry; animal welfare and religious concerns; Conversion of muscle to meat: postmortem changes in muscles and its conversion into meat; identification of wholesale and retail cuts; Abattoir infrastructure requirements: construction, general layout, equipment; abattoir hygiene: microbial control procedures; sanitation general and personnel hygiene; and sanitation; abattoir waste management; condemned material, Basic meat processing (abattoir environment): hygiene; packaging and preservation;. Methods used to evaluate qualities of meat; physical, sensory and chemical attributes of meat; factors affecting meat qualities. Milk quality, processing, preservation and storage. Egg quality, processing and storage; Hides and skin processing: quality of hides & skins, tanning process, quality of leather, Wool processing: Quality of wool, wool processing; Principles of quality management systems: Good Manufacturing Practices (GMP); food safety; food hygiene and sanitation, food laws and regulations; codex Alimentarius; Hazard Analysis Critical Control Point (HACCP) and ISO 9001:2000. Consumer concerns regarding the consumption of meat, milk and eggs.

Student Assessment Strategies
Continuous Assessment consists of 50% comprising of 1 assignment, 2 tests, 2 quizzes, 2 practical sessions; and a three-hour examination constitutes 50% of the final grade.

F3811AB BEEF PRODUCTION

Module Title:	BEEF PRODUCTION
Module Code	F3811AB
NQF Level	8
Notional Hours	200
Contact Hours	4 x 1-hour Lectures / week; 02 Practical hours alternate weeks for one semester
Additional learning requirements	Compulsory field trips / excursions; Farm attachments / group work
NQF Credits	20
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Namibian Beef industry: Importance of the Namibian beef industry, Conception to Consumption: Beef Industry stratification, Introduction and background' stakeholders and their roles, Legislation/policy, marketing channels and associated costs, understanding prices, industry performances, challenges faced by the meat industry, future prospects. Beef Production Systems: Commercial sector (Ranching- weaner & steer production, feedlotting); Stud breeders; Communal sector (Sedentary subsistence, nomadic herding, transhumance). Handling Facilities: Requisite facilities and equipment for a beef ranch: Camps, Corridors, Water supply, Cattle pens, Crush, Neck and body clamps, Scales, Loading ramps, Dips, spray race, Lick feed trough, Hay shelves. Equipment needed for: Identification, dehorning, castration, vaccination etc. Beef Cattle Breeding: Breeding objectives in beef cattle, bio-economic traits, herd fertility management, crossbreeding, commercial beef cattle breeding programs, continuous vs restricted breeding, Genotype x environment interactions. Beef Cattle Nutrition and Feeding: Nutrient requirements of the beef herd, Rangeland as basic feed, Major feeding systems including supplementary feeding, Feed additives, Potential nutritional & metabolic disorders. Cow-Calf Management: Body Condition Scoring, Management at Calving, Managing the Calf Crop, Weaning, sound beef cattle husbandry practices. Beef Cattle Growth: Principles and concepts, the growth curve and its phases, measures of growth, factors affecting growth and development, compensatory growth. Beef Herd Health: Herd Health Program, Common Diseases and parasites, Treatment of Calves, Cattle Vaccinations. Beef Cattle Transportation and Marketing: Transport and animal welfare, Management Factors Affecting Market Price.

Student Assessment Strategies
The assessment will include:
Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
Two 2-hour tests (60% of CA mark)
Two assignments (25% of CA mark)
Four marked practicals (15% of CA mark)
A 3-hour examination paper that will contribute 50 marks to the final mark.
The final mark will be calculated as follows:

50% CA mark + 50% Exam mark = 100 % final mark

F3811AP	RANGE MANAGEMENT
Module Title:	RANGE MANAGEMENT
Module Code	F3811AP
NQF Level	8
Notional Hours	200
Contact hours	4 x 1-hour Lectures / week; Practicals: 1 x 3 hours practical/weeks for one semester
Additional learning requirements	Include any compulsory field trips / excursions (outside the normal practicals); attachments / group work / project.
NQF Credits	20
(Co-requisites)	
Prerequisite	Introduction to Range Management
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Namibian range types and their characteristics: Overview of the carrying capacity of Namibian range types and carrying capacity determination; Morphology of common range plants: the structure of a grass plant; Flowering, stem & leaf development, elongation and tillering; Growth cycle of plants and plant & seed dormancy; Systematic botany with special focus on: Annuals & Perennials range plants, C3 vs. C4, (role of C3 vs C4 in Methane yield in rumen) shrubs, trees & bushes; Plant succession: Progressive; retrogression of range plants; Factors influencing succession; State & transition models; Animal-plant interactions on range: Animal-plant interface; The role of animal breed/size, dentition/digestive system vs. diet preference; Role of faeces, urine and trampling on range plants; Plant adaptation to herbivory; Grazing management systems & stocking rates; Continuous and rotational including multi-camp, non-selective & controlled selective grazing; Deferment; Zonal/centripetal grazing; Rangeland degradation: Bush encroachment, overgrazing, desertification and erosion; Land reclamation/restoration: Range evaluation and monitoring; Range condition & trend assessment; Drought management strategies in Namibia; Planted pastures: The role of cultivated pastures in a farming system; Selection & classification of pasture species; Seed quality – seed purity, seed scarification, seed inoculation, germination; Establishment & Management principles of pasture species; Pasture Forage conservation: The need of pasture conservation, Characteristics of species suitable for hay making, Characteristics of species suitable for silage making, Characteristics of species suitable for foggage; Hay Making: Grass and legume species suitable for hay making, Plant phenological development stage for hay making, Procedures in hay making, Factors affecting hay quality: Silage making: Grass and legume species suitable for silage making, Plant phenological development stage for silage making, Procedures in silage making, The ensiling process, Factors affecting silage quality; Foggage Production: Grass species suitable for foggage production; Foggage quality, Foggage grazing management; Hydroponic fodder production: Seed purity, Seed germination, Seed Scarification, Legume seed inoculation; Fodder Flow Planning: Why fodder flow planning, Fodder flow variable, Modification of feed supply on the farm, Modifying seasonal patterns of animal demand on the farm; Pasture Crops in Climate Change Mitigation: Practical feeding strategies, Feed quality of pasture crops, Enteric methane mitigation through use of pasture fodder; Seed production for sustainable pasture production.

Student Assessment Strategies
Continuous Assessment: 50% (2x assignments + 2 tests + at least 4 marked practicals).
Exam: 50% (1 x3 hours paper).

F3883AR	RESEARCH PROJECT
Module Title:	RESEARCH PROJECT
Module Code	F3883AR
NQF Level	8
Notional Hours	160
Contact hours	N/A
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	F3712CB: Biometry
Compulsory/Elective	Compulsory
Semester Offered	Semesters 1 and 2

Module Content
The module is Research based. It includes writing of research proposal in Animal Science, carrying out research under supervision of a Departmental lecturer, reviewing relevant literature on the topic under study, analyzing data and report presentation as well as research project write-up. Students should be able to utilize the plagiarism software and the plagiarism report Urkrud is to be applied consistently in the Department

Student Assessment Strategies
The Research Project Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:
Research Proposal Presentation - 10%

Draft Project Proposal - 15%
Draft research report presentation - 20%
Final marked report - 50%
Final corrected report - 5%
A minimum mark of 50% needs to be achieved in order to pass the module.

F3802AD	DAIRY PRODUCTION
Module Title:	DAIRY PRODUCTION
Module Code	F3802AD
NQF Level	8
Notional Hours	100
Contact hours	4 x 1-hour Lectures / week; 02 Practical hours alternate weeks for one semester
Additional learning requirements	Compulsory field trips / excursions; Farm attachments / group work
NQF Credits	10
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Dairy Cattle Breeding: Strategies for dairy genetic improvement in the tropics; bioeconomic traits in dairy cattle; heat detection in dairy cows; detecting reproductive problems; role of artificial insemination and other biotechnologies in genetic improvement; crossbreeding strategies; genotype x environment interactions. Dairy Cattle Nutrition and Feeding: Calf rearing, Heifer feeding management; Nutrient requirements of dairy animals; Dairy feeding systems – conventional, challenge, flat rate, budget, total mixed ration (TMR); Feeding the lactating cow, Feeding & management of dry cow, Feed formulation. Milk Production and Dairy Hygiene: Physiology of lactation; milk harvesting –types of milking parlors; milking machine, hand milking; factors which affect milk yield and composition, production of high-quality milk- good husbandry practices; clean milk production, quality control in milk and milk products. Mastitis and milk quality. Dairy Herd Health: Metabolic disorders, Mastitis, Internal & external parasites

Student Assessment Strategies
The assessment will include:
Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
Two 2-hour tests (60% of CA mark)
Two assignments (25% of CA mark)
Four marked practicals (15% of CA mark)
A 3-hour examination paper that will contribute 50 marks to the final mark.
The final mark will be calculated as follows:
50% CA mark + 50% Exam mark = 100 % final mark

F3812AS	SMALL RUMINANT PRODUCTION
Module Title:	SMALL RUMINANT PRODUCTION
Module Code	F3812AS
NQF Level	8
Notional Hours	200
Contact hours	4 x 1-hour Lectures / week; 03 Practical hours / week for one semester
Additional learning requirements	None
NQF Credits	20
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to small ruminant production: Roles, advantages and disadvantages; Overview of the Namibian sheep and goats Industry, its importance, legal and policy framework, Namibia's trade partners in meat, opportunities and challenges; Breeds of sheep and goats commonly farmed with in Namibia: Identify and discuss breeds in terms of their origin, characteristics and adaptability; Sheep/Goat production systems: A description of the traditional/Communal and modern/commercial sheep/goat production systems; Facilities and equipment: Requisite facilities required for small ruminant production, and equipment needed for husbandry practices; Feeding habits and grazing systems: Feeding/grazing habits of sheep and goats, grazing management and systems; Feeding management and nutrient requirements of sheep and goats: Feeding management and Nutrient requirement of sheep and goats in different stages of production (rams/bucks, ewes/does, lambs/kids); Selection and breeding of small ruminants: Factors to consider when selecting breeding animals (female and male), breeding/mating seasons and methods/systems, Estrous cycle, Estrus synchronization, improving flock fertility; Lambing and kidding management: Lambing/kidding and assistance, fostering, husbandry practices, weaning, management calendar, record keeping, factors affecting slaughter lamb production; Dairy goat production: feeding, reproduction and lactation management; Animal welfare and health: Animal welfare, common diseases and internal and external parasites, flock health programs; Transportation and Marketing of small ruminants: Transportation of sheep and goats, selecting right animals for marketing, marketing costs and marketing channels

Student Assessment Strategies
The assessment will include:
Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
Two tests (60% of CA mark)
Two assignments (25% of CA mark)
Five marked practicals/quizzes (15% of CA mark)
A 3-hour examination paper that will contribute 50 marks to the final mark.
The final mark will be calculated as follows:
50% CA mark + 50% Exam mark = 100 % final mark

F3812AM	MONOGASTRIC ANIMAL PRODUCTION
Module Title:	MONOGASTRIC ANIMAL PRODUCTION
Module Code	F3812AM
NQF Level	8
Notional Hours	200
Contact hours	4 x 1-hour Lectures / week; 3 Practical hours alternate weeks for one semester
Additional learning requirements	Compulsory field trips / excursions; Farm attachments / group work
NQF Credits	20
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Namibian poultry industry: The type of poultry production systems; factors for success in poultry farming; breeds and strains of chicken; the socio-economic importance of poultry production in Namibia; prospects and challenges of poultry production in Namibia; Poultry production systems: extensive, semi-intensive; intensive; Poultry housing: types of houses; location and layout; ventilation; floor space requirements; daily routine management procedures; Management poultry nutrition: digestive system; digestion; mixing diets for poultry; management and feeding of chickens; Poultry Reproduction; egg formation, egg selection, care and storage of hatching eggs; incubation methods; types of incubators; incubation requirements; egg candling, embryonic development; factors influencing fertility, factors affecting hatchability; and quality of chicks; hatchery sanitation and waste management; trouble shooting during incubation; incubation records, egg candling; Management of chicks at a hatchery: evaluation of chick quality and chick sexing.. Brooding management for broiler and layer chickens: brooding types, preparation of a brooder house for the arrival of chicks; placing of chicks in the brooder; monitoring of chicks after placement; poultry records: Importance of records keeping; types of records kept for broilers and layers; culling management of chickens; Nutrients requirement poultry & feeding management: feeding of chickens at different stages, (day old chicks, grower and layers; poultry building and equipment. feed Ingredients for egg and meat chickens, cannibalisms and control vaccination of Layers chickens, layers chicken layers hen Selection, o identifying better point of lay Birds (POL) before purchasing them, identify poor and good layers in commercial layer chickens, Diseases of poultry; the maintenance of good health (biosecurity), types of disease affecting broilers and layers the prevention of disease, the importance of early recognition of disease, the early treatment of disease. Egg collection, and storage for commercial purposes. egg packaging, functions of packaging, factors that must be taken into consideration for packaging different types of egg packages; labelling, cost o packing, storage of eggs, layout of packaging and storage facilities of eggs; transportation of shell eggs and its requirement for transporting eggs, Biosecurity measures on a poultry farm; Diseases and parasites of poultry.
Namibian pig industry attributes of pig farming, factors for success in pig farming; -origin and distribution of pigs, aims and advantages, limitations; Prospects and challenges of pig production in Namibia; breeds of pigs and characteristics, Pig production Systems: extensive, semi-intensive; intensive, integrated, Pig reproduction(production cycle: management of pregnant, lactating and dry sow, mating management; type of mating, common reproduction problems, boar and gilt selection, factors affecting puberty.. Pig housing: reasons for housing pigs, selection of housing site, construction of pig house general design consideration; ventilation; floor space requirements; routine management from farrowing to weaning (maintaining temperatures, removal of mucus membrane cutting needle cross-fostering, split suckling, supplementation, ear notching, creep feeding. Housing systems; Mating (Boar shed) Gestation (Dry sow shed) Farrowing, weaner grower finisher Pig nutrition: digestive system; digestion; voluntary feed intake; factors affecting nutrient requirement s in pgs, management and feeding of pigs. Pig records: Importance of records keeping; types of records kept; Biosecurity: reason for biosecurity measures on a pig farm; Diseases and parasites of pigs.

Student Assessment Strategies
The assessment will include:
Continuous assessment will contribute 50 marks (50%) to the final mark composed of:
2-hour tests
1 assignment
2 quizzes
3 practicals
3-hour examination paper that will contribute 50 marks to the final mark.
The final mark will be calculated as follows: 50% CA mark + 50% Exam mark = 100 % final mark

E.2.1.3 BACHELOR OF SCIENCE IN AGRICULTURAL POLICY ANALYSIS (HONOURS)

ADMISSION REQUIREMENTS

The normal basic requirement for entrance into the Honours in Agricultural Policy degree programme shall be a pass in the BSc in Agricultural economics degree (NQA level 7) with average of 50% in the final year and related fields such as Bachelor's degrees in Economics, Business Management, and Administration, etc.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4810EP	Research Proposal	8	14	(2L/wk)	None	C
F3880AD	Design thinking	8	8	(2L/wk)	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4883ER	Research Project	8	8	(2L+2T/wk)2	None	C
F4831EQ	Quantitative Methods in Agribusiness & Economics	8	18	(4L+2PT/wk)	None	C
G4811EP	Economic Theory and Policy	8	18	4L/wk	None	C
F4821EI	International Agricultural Trade and Policy	8	9	(2L+1T/wk)	None	C
TOTAL Semester I						**53**
Year 1: Semester 2						
F4883ER	Research Project	8	8	(2L+2T/wk)	None	C
F4832EA	Agricultural Policy Analysis	8	18	(4L+2T/wk)	None	C
F4822EC	Agricultural Commodity Analysis	8	9	(2l+1T/wk)	None	C
F4832EV	Value and Supply chain Management	8	18	(4L+2T/wk)	None	C
TOTAL Semester 2						**53**
Total credits for the Honors programme for the Agricultural Policy Analysis						**128**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F3880AD	DESIGN THINKING
Module Title:	Design Thinking
Module Code	F3880AD
NQF Level	8
Notional Hours	80
Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The module aims to develop critical thinking and problem-solving skills. To develop interdisciplinary thought, problem structuring and design thinking skills, inculcating innovation, concept development, applied creativity, prototyping and experimentation.

Module Content

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Learning and Teaching Strategies/Activities

- Lectures: A blended learning mode will be used
- Group discussions & presentations: Students will be assigned some tasks in a group to enhance communication and team work skills. Some tasks will be assigned in groups for oral presentations in order to enhance critical thinking & presentation skills.
- Expand according to the programme.

Student Assessment Strategies

- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F4810EP	RESEARCH PROPOSAL
Module Title:	Research Proposal
Module Code	F4810EP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

This module introduces research process and enable students to produce a research proposal ready for implementation. The module focuses on specific aspects of doing research including: identifying research gaps through stating the research problem, framing the research question and determining research approaches and designs; and ethical issues, reviewing literature that links to the research objectives and critical appraisal; reference management.

Module Content

Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies

The assessment will include:

The module is based on 100% continuous assessment and the final mark will be calculated as follows:

- Module assessment quizzes (20%)
- Proposal report (50%)
- Proposal presentation (20%)
- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)
- A minimum mark of 50% needs to be achieved in order to pass the module

Semester 1

F4883ER	RESEARCH PROJECT
Module Title:	Research Project
Course Code	F4883ER
NQF Level	16
Notional Hours	160
Additional learning requirements	
Contact Hours	2 lecture periods per week and 1 x 3hour practical every two weeks for one semester
NQF Credits	9
Prerequisite	Research Proposal and Quantitative Methods in Agribusiness and Economics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course is designed to give the students an opportunity to perform a research project under supervision according to an individual study plan and to summarize the results in a research report and present the results of the project.

Module Content

Introduction to Research; Definition of Research, Rationale for research. **Literature Review;** Importance of literature review; How to undertake literature review; Citation; Plagiarism. **Research Design**; Quantitative vs qualitative research design; Dimensions of research; Research types. **Data gathering**; Types of data; Sampling; Process of data; Filter of data. **Data analysis**; Descriptive analysis; Bivariate and Multivariate Analysis Techniques; Time series; Panel data; Discrimination Analysis; Causality analysis. **Research discussion and Interpretation**; Interpreting research results; Precision Rate; Confidence Level; Non- and parametric Tests of Hypotheses; Test of logics, Comparison with literature findings; Extraction for Conclusion and Recommendations. **Scientific Report writing**; Structure of the scientific report; Use of the Internet; References; Presentation with use of Pictures and Graphs; Report formatting; Language editing; Research ethics. Students should be able to utilize the plagiarism software and the plagiarism report Turnitin is to be applied consistently in the Department

Learning and Teaching Strategies/Activities

Students will carry out their research under the supervision of at least one supervisor who will guide them. Students will present their topic to the Department, submit a research proposal and write up a final research project and give a final presentation.

Student Assessment Strategies

The Research Project Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Research Proposal Presentation - 10%
- Draft Project Proposal - 15%
- Draft research report presentation - 20%
- Final marked report - 50%
- Final corrected report - 5%

A minimum mark of 50% needs to be achieved in order to pass the module.

F4831EQ	QUANTITATIVE METHODS IN AGRIBUSINESS AND ECONOMICS
Module Title:	Quantitative Methods in Agribusiness and Economics
Course Code	F4831EQ
NQF Level	8
Notional Hours	180
Additional learning requirements	Individual assignments and case studies
Contact Hours	4 Lectures + 2 Tutorials / week
NQF Credits	18
Prerequisite	Research Proposal and Quantitative Methods in Agribusiness and Economics
Compulsory/Elective	Compulsory

Semester Offered Semester 1

Module Purpose

The purpose of this module to enhance the knowledge of students with quantitative methods applicable to agribusiness and economics

Module Content:

Different quantitative and qualitative methods used by agricultural economists: Time series analysis and some examples; Panel data analysis and some examples. Test of Hypotheses; Review of Time series model; stationarity, applying Autoregressive (AR), Moving Average (MA), and ARMA models to equations; Cross-sectional and panel data models. Linear and non-linear models for forecasting and prediction; Model specification, estimation and solutions. Dynamic models under Time series; Autoregressive distributed lags (ARDL), Autoregressive Conditional Heteroscedasticity (ARCH), Generalized autoregressive conditional heteroscedasticity (GARCH) and Integrated autoregressive moving average models (ARIMA). Dynamic models using panel data; Error Component Regression model; Arellano and Bond Estimator, Generalised Methods of Moments (GMM) Estimator, unbalanced Panel data Models. How to work with nonstationary panels. Application of the different methods to empirical research to agriculture and agribusiness scenarios. Formulation of the different models; Econometric standard software such as Stata.

Learning and Teaching Strategies/Activities

1. Lectures
2. Tutorials in the computer lab.
3. Consultations

Student Assessment Strategies

1. Continuous 50% (2 Tests (30%), assignments (20%).
2. Examination 50% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F4831EI INTERNATIONAL AGRICULTURAL TRADE AND POLICY

Module Title:	International Agricultural Trade and Policy
Course Code	F4831EI
NQF Level	8
Notional Hours	90
Additional learning requirements	Group work, projects and case studies
Contact Hours	2 Lectures + 1 Tutorials / Week
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: expose students to concepts of globalization and international agricultural trade.

Module Content

International Trade Theory: The Law of Comparative Advantage, the Standard Theory of International Trade, demand and supply, Offer Curves, and the terms of trade, factor Endowments and the Heckscher–Ohlin Theory, Economies of Scale, Imperfect Competition, and International Trade, Economic Growth and International Trade. International Trade Policy: Trade Restrictions, Tariffs, Nontariff Trade Barriers and the New Protectionism. Economic Integration: Customs Unions and Free Trade Areas. International Trade and Economic Development: International Resource Movements and Multinational Corporations. The Balance of Payments, Foreign Exchange Markets, and Exchange Rates: Balance of Payments, Foreign Exchange Markets and Exchange Rates, Exchange Rate Determination.

Learning and Teaching Strategies/Activities

1 Lectures/guest Lectures
2 Tutorials
3 Consultations

Student Assessment Strategies

1 Continuous 50% (2 Tests (30%), assignments (20%).
2 Examination 50% (3 hours)
3 To pass this module a student should obtain a minimum final mark of 50%.

F4811EP ECONOMIC THEORY AND POLICY

Module Title: Economic Theory and Policy

Course Code	F4811EP
NQF Level	8
Notional Hours	90
Additional learning requirements	None
Contact Hours	4h/w
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to equip students with the know-how of various aggregate economic identities are related, and problem and policy lessons that can be learned from them. Labour market structure issues and policy choices used elsewhere to improve employment. Behavioral theories of macroeconomics, how policies can bring about behavioral changes and impact the economy. To learn about AD and AS and how use them to study business fluctuations, about demand and supply that are used to influence the economy

Module Content

Economic theory and Policy: Macroeconomic perspective; Long-term Economic Performance: The Solow Model, the Endogenous Technological Change, Institutions and Efficiency; The macroeconomy in the Medium Run: the labour market, Wages and unemployment; The microeconomy in the short-run: short run model, the business cycle properties and indicators, contemporary issues in macroeconomics.

Learning and Teaching Strategies/Activities

The module will be facilitated through the following learning activities: lectures, class participation, presentations, written assignments and tests, and a written examination.

Student Assessment Strategies

Continuous assessment contributes 50% of the final mark. The continuous assessment consists of two tests and one assignment. There will be a 3-hour examination paper that contributes 50% to the final mark.

Semester 2

F4832EC	AGRICULTURAL COMMODITY ANALYSIS
Module Title:	Agricultural Commodity Analysis
Course Code	F4832EC
NQF Level	8
Notional Hours	90
Additional learning requirements	Individual assignments and case studies
Contact Hours	2h lectures + 1 Tutorials / week
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with framework for undertaking agricultural commodity analysis in the food systems.

Module Content:

Generation of econometric and simulation models: recursive and simultaneous supply-demand models; building econometric/simulation model; gauss-seidel algorithm, guidelines for model building. **Commodity balance sheet**, supply, demand and export market. **Forecast evaluation**; asymmetric errors, measures of total error, measure of bias error, handling exogenous variables, handling of random error. **Generating long-term projections and application**: quantitative approach, combining subjective and quantitative methods. **Spatial commodity analysis and trade**, simple trade model, interregional analysis. **Application of commodity models to long-range planning and policy analysis**, farmers and agribusinesses, policy analysis, policy instruments, dynamic v. static. **Short-term forecasting;** Futures markets and sources of market information, seasonal, generating seasonal price patterns, commodity futures and options markets, forward pricing with futures and options, price discovery and market efficiency, moving averages and stochastics. **Sources of agricultural data and market analysis;** commodity and market analysis using Eviews and Stata software (the windows version).

Learning and Teaching Strategies/Activities

1 Lectures
2 Tutorials in the computer lab
3 Consultations

Student Assessment Strategies

1 Continuous 50% (2 Tests (30%), assignments (20%).
2 Examination 50% (3 hours)
3 To pass this module a student should obtain a minimum final mark of 50%.

F4832EA AGRICULTURAL POLICY ANALYSIS

Module Title:	Agricultural Policy Analysis
Course Code	F4832EA
NQF Level	8
Notional Hours	180
Additional learning requirements	Individual assignments and case studies
Contact Hours	4h lectures + 2 Tutorials / week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to provide students with the framework for analysing agricultural policy analysis in the agricultural sector.

Module Content

Role of agriculture in economic development: strategic economic significance of the agriculture sector in the overall economic development process. ole the sector must play in the economic development of majority of developing countries. two-sector model (Agriculture – None Agriculture) and analyse major linkages between the agricultural sector and the rest of the economy. Theoretical foundations of agricultural policy: government intervention in agricultural production and trade. Incomplete and missing markets as results from public goods, externalities, transaction costs and asymmetric information, scale economics; Equity problems. Policy-making process, and policy environment: participatory policy-making. approaches of linking formulation, implementation and enforcement of a policy, and the people. Political economy of agricultural policy: institutional economic point of view by illustrating the role of interest groups, politicians and voters in the making of agricultural policy. Game Theory and a range of models to explain the decision making in agricultural policy will be presented. Agricultural policy objectives analysis: corrective policy, distributive policy, sustainable development policy, and paternalist argument; Instruments of agricultural policy (tax, subsidies, regulations; Constraints to agricultural policy formulation and implementation. Economics of public policy analysis: Demand and supply elasticities and projections, Compensation and equivalent variation, Socio-economic indicators including poverty measures, the Gini co-efficient as a measure of equity/inequality, Measures of poverty levels and alleviation. Empirical tools of policy evaluation: Quantitative analysis of Agricultural Policies, Partial Equilibrium Framework in assessing policy impacts, General Equilibrium Framework in assessing the policy impacts, Social Accounting Matrix (SAM) and Policy Analysis Matrix (PAM): policy design: policy instrument and impacts on supply/demand framework and Policy design impact matrix. Monitoring policy impacts: monitoring policy impacts (MPI), MPI in the cycle of policy formulation and implementation and analytical methods. Agriculture sector analysis: Models of the agricultural sector and structural adjustment policies and the agricultural sector.

Learning and Teaching Strategies/Activities

1. Lectures
2. Tutorials in the computer lab
3. Consultations

Student Assessment Strategies
1. Continuous 50% (2 Tests (30%), assignments (20%).
2. Examination 50% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F4832EV VALUE AND SUPPLY CHAIN MANAGEMENT

Module Title:	Value and Supply Chain Management
Course Code	F4832EV
NQF Level	8
Notional Hours	180
Additional learning requirements	Group work, projects and case studies
Contact Hours	4 Lectures + 2 Tutorials / Week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to introduce students to principles and practice of value and supply chain management.

Module Content

The Value chain map; meaning of value chain, importance of value chain, types of value chains, governance in value chains, Innovation and upgrading in agricultural value chains; technological, financial, network, Infrastructural innovations, process upgrading, product upgrading, functional upgrading, horizontal, vertical coordination and other types of upgrading, chain upgrading, Value chain analysis and the determinants of income distribution; mapping distributional outcomes in the value chain, understanding the determinants of income distribution in value chain, power in value chain dynamics, producers access in final markets, Benchmarking production efficiency, Point of entry into the value chain, Market characteristics and critical success factor's, Economic analysis of value chains; market analysis, Quantifying value chains, calculating value-added, calculating production cost in value chains, agricultural chain cost distribution, use of templates and workbooks analysis, Value Chain Clustering and competitiveness; concept of agriculture clusters, concept of agri-value chain clusters, Other value chain considerations; value chains are not just about export produce, Keeping records and getting market information, Gender and value chains, Strengthening private business linkages, associations and partnerships, Agricultural value chain finance, Policy implications, Integrated agri-supply chain management; food supply chain networks, components of agri-supply chains, agri-marketing and coordinated supply chains; supply chain management for selected commodities (horticulture, dairy, poultry, pork, beef, grapes, dates etc.), Unpredictability and fragility in supply chains; Historic distortions, equitable processes required to reallocate resources in times of distortions. the concept of supply chain resilience and competitiveness.

Learning and Teaching Strategies/Activities

1. Lectures
2. Tutorials
3. Consultations
4. Group work
5. Class discussions

Student Assessment Strategies

1. Continuous 50% (2 Tests (30%), assignments (20%).
2. Examination 50% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

E.2.1.4 BACHELOR OF SCIENCE IN AGRIBUSINESS MANAGEMENT (HONOURS)

ADMISSION REQUIREMENTS

Normal basic requirement for entrance into the Honours in Agribusiness Management degree programme shall be a pass in the BSc in Agricultural economics degree (NQA level 7), related fields such as bachelor's degrees in economics, Business Management, and Administration, or recognition of prior learning in similar fields.

Additional Selection Criteria

Priority will be given to the best performing who applied for this programme as their first choice. If many students qualify for the programme and there is a limited number of places available for placement, regional representatives, indigenous groups, and gender equity will be considered based on UNAM regulations and national policies guidelines.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4810EP	Research Proposal	8	14	(2L/wk)	None	C
F3880AD	Design thinking	8	8	(2L/wk)	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4883ER	Research Project	8	8	(2L+2T/wk)2	None	C
F4831BQ	Quantitative Methods in Agribusiness & Economics	8	18	(4L+2T/wk)	None	C
F4811EP	Economic Theory and Policy	8	18	4L/wk	None	C
F4821BI	International Agricultural Trade and Policy	8	9	(2L+1T/wk)	None	C
TOTAL Semester I						**53**
Year 1: Semester 2						
F4883ER	Research Project	8	8	(2L+2T/wk)	None	C
F4832BV	Value and Supply chain Management	8	18	(4L+2T/wk	None	C
F4822BD	Enterprise Development and Innovation	8	9	(2L+1T/wk)	None	C
F4832BM	Agribusiness' Management	8	18	(4L+2T/wk)	None	C
Total Credits Semester 2						**53**
Total credits for YEAR 1						**128**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F3880AD	DESIGN THINKING
Module Title:	Design Thinking
Module Code	F3880AD
NQF Level	8
Notional Hours	80
Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The module aims to develop critical thinking and problem-solving skills. To develop interdisciplinary thought, problem structuring and design thinking skills, inculcating innovation, concept development, applied creativity, prototyping and experimentation.

Module Content

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Learning and Teaching Strategies/Activities

- Lectures: A blended learning mode will be used
- Group discussions & presentations: Students will be assigned some tasks in a group to enhance communication and team work skills. Some tasks will be assigned in groups for oral presentations in order to enhance critical thinking & presentation skills.
- Expand according to the programme.

Student Assessment Strategies

- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F4810EP	RESEARCH PROPOSAL
Module Title:	Research Proposal
Module Code	F4810EP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

This module introduces research process and enable students to produce a research proposal ready for implementation. The module focuses on specific aspects of doing research including: identifying research gaps through stating the research problem, framing the research question and determining research approaches and designs; and ethical issues, reviewing literature that links to the research objectives and critical appraisal; reference management.

Module Content

Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies

The assessment will include:

The module is based on 100% continuous assessment and the final mark will be calculated as follows:

- Module assessment quizzes (20%)
- Proposal report (50%)
- Proposal presentation (20%)
- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)
- A minimum mark of 50% needs to be achieved in order to pass the module

Semester 1:

F4883ER	RESEARCH PROJECT
Module Title:	Research Project
Course Code	F4883ER
NQF Level	16
Notional Hours	160
Additional learning requirements	
Contact Hours	2 lecture periods per week and 1 x 3hour practical every two weeks for one semester
NQF Credits	9
Prerequisite	Research Proposal and Quantitative Methods in Agribusiness and Economics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course is designed to give the students an opportunity to perform a research project under supervision according to an individual study plan and to summarize the results in a research report and present the results of the project.

Module Content

Introduction to Research; Definition of Research, Rationale for research. **Literature Review;** Importance of literature review; How to undertake literature review; Citation; Plagiarism. **Research Design**; Quantitative vs qualitative research design; Dimensions of research; Research types. **Data gathering**; Types of data; Sampling; Process of data; Filter of data. **Data analysis**; Descriptive analysis; Bivariate and Multivariate Analysis Techniques; Time series; Panel data; Discrimination Analysis; Causality analysis. **Research discussion and Interpretation**; Interpreting research results; Precision Rate; Confidence Level; Non- and parametric Tests of Hypotheses; Test of logics, Comparison with literature findings; Extraction for Conclusion and Recommendations. **Scientific Report writing**; Structure of the scientific report; Use of the Internet; References; Presentation with use of Pictures and Graphs; Report formatting; Language editing; Research ethics. Students should be able to utilize the plagiarism software and the plagiarism report Turnitin is to be applied consistently in the Department

Learning and Teaching Strategies/Activities

Students will carry out their research under the supervision of at least one supervisor who will guide them. Students will present their topic to the Department, submit a research proposal and write up a final research project and give a final presentation.

Student Assessment Strategies

The Research Project Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Research Proposal Presentation - 10%
- Draft Project Proposal - 15%
- Draft research report presentation - 20%
- Final marked report - 50%
- Final corrected report - 5%

A minimum mark of 50% needs to be achieved in order to pass the module.

F4801EG	QUANTITATIVE METHODS IN AGRIBUSINESS AND ECONOMICS
Module Title:	Quantitative Methods in Agribusiness and Economics
Course Code	F4831BQ
NQF Level	8
Notional Hours	180
Additional learning requirements	Individual assignments and case studies
Contact Hours	4 Lectures + 3 Tutorials per week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module to enhance the knowledge of students with quantitative methods applicable to agribusiness and economics.

Module Content:
Different quantitative and qualitative methods used by agricultural economists: Time series analysis and some examples; Panel data analysis and some examples. Test of Hypotheses; Review of Time series model; stationarity, applying Autoregressive (AR), Moving Average (MA), and ARMA models to equations; Cross-sectional and panel data models. Linear and non-linear models for forecasting and prediction; Model specification, estimation and solutions. Dynamic models under Time series; Autoregressive distributed lags (ARDL), Autoregressive Conditional Heteroscedasticity (ARCH), Generalized autoregressive conditional heteroscedasticity (GARCH) and Integrated autoregressive moving average models (ARIMA). Dynamic models using panel data; Error Component Regression model; Arellano and Bond Estimator, Generalised Methods of Moments (GMM) Estimator, unbalanced Panel data Models. How to work with nonstationary panels. Application of the different methods to empirical research to agriculture and agribusiness scenarios. Formulation of the different models; Econometric standard software such as Stata.

Learning and Teaching Strategies/Activities
1. Lectures
2. Tutorials in the computer lab.
3. Consultations

Student Assessment Strategies
1. Continuous 50% [2 Tests (30%), assignments (20%)].
2. Examination 50% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F4821BI INTERNATIONAL AGRICULTURAL TRADE AND POLICY

Module Title:	International Agricultural trade and Policy
Course Code	F4821BI
NQF Level	8
Notional Hours	90
Additional learning requirements	Group work, projects and case studies
Contact Hours	2 Lectures + 1 Tutorials / Week
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
The purpose of this module to enhance the knowledge of students with quantitative methods applicable to agribusiness and economics.

Module Content

International Trade Theory: The Law of Comparative Advantage, the Standard Theory of International Trade, demand and supply, Offer Curves, and the terms of trade, factor Endowments and the Heckscher–Ohlin Theory, Economies of Scale, Imperfect Competition, and International Trade, Economic Growth and International Trade. International Trade Policy: Trade Restrictions, Tariffs, Nontariff Trade Barriers and the New Protectionism. Economic Integration: Customs Unions and Free Trade Areas. International Trade and Economic Development: International Resource Movements and Multinational Corporations. The Balance of Payments, Foreign Exchange Markets, and Exchange Rates: Balance of Payments, Foreign Exchange Markets and Exchange Rates, Exchange Rate Determination.

Learning and Teaching Strategies/Activities

1 Lectures/guest Lectures
2 Tutorials
3 Consultations

Student Assessment Strategies

1 Continuous 50% (2 Tests (30%), assignments (20%).
2 Examination 50% (3 hours)
3 To pass this module a student should obtain a minimum final mark of 50%.

F4811EP ECONOMIC THEORY AND POLICY

Module Title:	Economic Theory and Policy
Course Code	F4811EP

NQF Level	8
Notional Hours	180
Additional learning requirements	None
Contact Hours	4h/w
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to equip students with the know-how of various aggregate economic identities are related, and problem and policy lessons that can be learned from them. Labour market structure issues and policy choices used elsewhere to improve employment. Behavioural theories of macroeconomics, how policies can bring about behavioural changes and impact the economy. To learn about AD and AS and how use them to study business fluctuations, about demand and supply that are used to influence the economy

Module Content

Economic theory and Policy: Macroeconomic perspective; Long-term Economic Performance: The Solow Model, the Endogenous Technological Change, Institutions and Efficiency; The macroeconomy in the Medium Run: the labour market, Wages and unemployment; The microeconomy in the short-run: short run model, the business cycle properties and indicators, contemporary issues in macroeconomics.

Learning and Teaching Strategies/Activities

The module will be facilitated through the following learning activities: lectures, class participation, presentations, written assignments and tests, and a written examination.

Student Assessment Strategies

Continuous assessment contributes 50% of the final mark. The continuous assessment consists of two tests and one assignment. There will be a 3-hour examination paper that contributes 50% to the final mark.

Semester 2:

F4832BM	AGRIBUSINESS MANAGEMENT
Module Title:	Agribusiness Management
Course Code	F4832BM
NQF Level	8
Notional Hours	180
Additional learning requirements	Group work, projects and case studies
Contact Hours	4 Lectures + 2 Tutorials / Week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to: acquaint students with principles and practice of agribusiness and supply chain management.

Module Content

Management principles and practices for (marketing, finance, supply chain, and human resources); management functions for agribusiness (planning, organizing, directing and controlling); Microeconomic principles for decision making in agribusiness; international agribusiness; Strategic market planning; marketing mix, marketing decisions for agribusiness (marketing audit), (futures markets) managing understanding financial statements, Role of Prices and Approaches to Agricultural Market Organization and Performance. Market Structure and Performance. Households, Markets and Consumption, Market Characteristics. Demand Analysis. Spatial and Inter-Temporal Analysis of Agricultural Markets for Policy. Finance analyzing financial statements, financing for the agribusiness Tools for evaluating operating decisions; Security analysis, valuation and management; Risk and Risk Management in Agribusiness tools for evaluating investment decisions; production planning for agribusiness; supply chain management and its importance for agribusiness; managing the organizational structure; human resources and its role in agribusiness. Stochastic efficiency measures and simulation. Dynamic decision models; The status of agribusiness management in Namibia using some examples. Strategic management concepts for agribusiness in the global marketplace.

Learning and Teaching Strategies/Activities

1. Lectures
2. Tutorials
3. Consultations

Student Assessment Strategies

1. Continuous 50% (2 Tests (30%), assignments (20%).

2 Examination 50% (3 hours)

3 To pass this module a student should obtain a minimum final mark of 50%.

F483BV	VALUE AND SUPPLY CHAIN MANAGEMENT
Module Title:	Value and Supply Chain Management
Course Code	F483BV
NQF Level	8
Notional Hours	180
Additional learning requirements	Group work, projects and case studies
Contact Hours	4 Lectures + 2 Tutorials / Week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to introduce students to principles and practice of value and supply chain management

Module Content

The Value chain map; meaning of value chain, importance of value chain, types of value chains, governance in value chains, Innovation and upgrading in agricultural value chains; technological, financial, network, Infrastructural innovations, process upgrading, product upgrading, functional upgrading, horizontal, vertical coordination and other types of upgrading, chain upgrading, Value chain analysis and the determinants of income distribution; mapping distributional outcomes in the value chain, understanding the determinants of income distribution in value chain, power in value chain dynamics, producers access in final markets, Benchmarking production efficiency, Point of entry into the value chain, Market characteristics and critical success factor's, Economic analysis of value chains; market analysis, Quantifying value chains, calculating value-added, calculating production cost in value chains, agricultural chain cost distribution, use of templates and workbooks analysis, the cross functional and multidisciplinary nature of supply chain management as it applies in the global food industry, Value Chain Clustering and competitiveness; concept of agriculture clusters, concept of agri-value chain clusters, Other value chain considerations; value chains are not just about export produce, Keeping records and getting market information, Gender and value chains, Strengthening private business linkages, associations and partnerships, Agricultural value chain finance, Policy implications, Integrated agri-supply chain management; food supply chain networks, components of agri-supply chains, agri-marketing and coordinated supply chains; supply chain management for selected commodities (horticulture, dairy, poultry, pork, beef, grapes, dates etc.), practical experience of undertaking a supply chain audit, with a view to establishing an appropriate business strategy for a food manufacturing company. Unpredictability and fragility in supply chains; Historic distortions, equitable processes required to reallocate resources in times of distortions. the concept of supply chain resilience and competitiveness.

Student Assessment Strategies

1. Continuous 50% (2 Tests (30%), assignments (20%).
2. Examination 50% (3 hours)
3. To pass this module a student should obtain a minimum final mark of 50%.

F4832BD	ENTERPRISE DEVELOPMENT AND INNOVATION
Module Title:	Enterprise Development and Innovation
Course Code	F4832BD
NQF Level	8
Notional Hours	90
Additional learning requirements	Group work, projects and case studies
Contact Hours	2 Lectures + 1 Tutorials / Week
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to create entrepreneurial mindset and awareness as well as impart practical knowledge on the formation and development of agribusiness enterprises in Namibia.

Module Content

Entrepreneurship and Opportunity; understanding entrepreneurship, preparing for the entrepreneurship journey, creating an opportunity. Feasibility Analysis; analyzing industry and markets, developing and testing business model, prototyping and validating a solution, protecting start-up assets, building a founding team, calculating start-up capital requirement. Business Design; preparing a business plan, designing an entrepreneurial company, planning start-up operations, choosing legal form of organization, developing a start-up marketing plan, incorporating ethics and social responsibility into the business. Planning for Growth and Change; funding start-up and growth, planning for start-up growth and change. Strategies for modernising agriculture (lessons from experience). Poverty dynamics, food and the environmental nexus. Role of BIPA (intellectual property rights, business registration and regulatory environment), business tax management in Namibia.

Student Assessment Strategies

1. Continuous Assessment 50% (mini-projects, case studies).
2. Examination 50% (Written submission of business proposal (25%) Oral presentation of business proposal (25%)), no written examination.
3. To pass this module a student should obtain a minimum final mark of 50%.

E.2.1.5 BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSIONS

ADMISSION REQUIREMENTS

Admission to the Bachelor of Science in Agricultural Extension Honours program requires applicants to hold a Bachelor of Science degree in Crop Production, Forestry, or Agricultural Economics (NQA Level 7) from UNAM or an equivalent qualification from a recognized institution of higher education.

Additional Selection Criteria

Priority will be given to the best-performing candidates who applied for this programme as their first choice. If many students qualify for the programme and there is a limited number of places available for placement, regional representatives, indigenous groups, and gender equity will be considered based on UNAM regulations and national policy guidelines.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4810EP	Research Proposal	8	14	(2L/wk)	None	C
F3880AD	Design thinking	8	8	(2L/wk)	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4883ER	Research Project	8	8	(2L+2T/wk)2	None	C
F4801EG	Group Dynamics Leadership	8	9	(2L+1T	None	C
F4831EE	Extension Landscape and Innovation	8	18	4L+1T	None	C
F4831ED	Digital Communication and Technology	8	20	(4L+2P	None	C
TOTAL Semester I						**55**
Year 1: Semester 2						
F4883ER	Research Project	8	8	(2L+2T/wk)	None	C
F4832EA	Agripreneurship and Value Chain Development	8	18	4L+2T	None	C
F4832EE	Extension Programme and Management	8	18	4L+2T	None	C
F4802EG	Gender and Rural Development	8	9	2L	None	C
Total Credits Semester 2						**53**
Total credits for YEAR 1						**130**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F3880AD	DESIGN THINKING
Module Title:	Design Thinking
Module Code	F3880AD
NQF Level	8
Notional Hours	80
Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The module aims to develop critical thinking and problem-solving skills. To develop interdisciplinary thought, problem structuring and design thinking skills, inculcating innovation, concept development, applied creativity, prototyping and experimentation.

Module Content

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Learning and Teaching Strategies/Activities

- Lectures: A blended learning mode will be used
- Group discussions & presentations: Students will be assigned some tasks in a group to enhance communication and team work skills. Some tasks will be assigned in groups for oral presentations in order to enhance critical thinking & presentation skills.
- Expand according to the programme.

Student Assessment Strategies

- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F4810EP	RESEARCH PROPOSAL
Module Title:	Research Proposal
Module Code	F4810EP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

This module introduces research process and enable students to produce a research proposal ready for implementation. The module focuses on specific aspects of doing research including: identifying research gaps through stating the research problem, framing the research question and determining research approaches and designs; and ethical issues, reviewing literature that links to the research objectives and critical appraisal; reference management.

Module Content

Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies

The assessment will include:

The module is based on 100% continuous assessment and the final mark will be calculated as follows:

- Module assessment quizzes (20%)
- Proposal report (50%)

- Proposal presentation (20%)
- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)
- A minimum mark of 50% needs to be achieved in order to pass the module

Semester 1:

F4883ER	RESEARCH PROJECT
Module Title:	Research Project
Course Code	F4883ER
NQF Level	16
Notional Hours	160
Additional learning requirements	
Contact Hours	2 lecture periods per week and 1 x 3hour practical every two weeks for one semester
NQF Credits	9
Prerequisite	Research Proposal and Quantitative Methods in Agribusiness and Economics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course is designed to give the students an opportunity to perform a research project under supervision according to an individual study plan and to summarize the results in a research report and present the results of the project.

Module Content

Introduction to Research; Definition of Research, Rationale for research. **Literature Review;** Importance of literature review; How to undertake literature review; Citation; Plagiarism. **Research Design**; Quantitative vs qualitative research design; Dimensions of research; Research types. **Data gathering**; Types of data; Sampling; Process of data; Filter of data. **Data analysis**; Descriptive analysis; Bivariate and Multivariate Analysis Techniques; Time series; Panel data; Discrimination Analysis; Causality analysis. **Research discussion and Interpretation**; Interpreting research results; Precision Rate; Confidence Level; Non- and parametric Tests of Hypotheses; Test of logics, Comparison with literature findings; Extraction for Conclusion and Recommendations. **Scientific Report writing**; Structure of the scientific report; Use of the Internet; References; Presentation with use of Pictures and Graphs; Report formatting; Language editing; Research ethics. Students should be able to utilize the plagiarism software and the plagiarism report Turnitin is to be applied consistently in the Department

Learning and Teaching Strategies/Activities

Students will carry out their research under the supervision of at least one supervisor who will guide them. Students will present their topic to the Department, submit a research proposal and write up a final research project and give a final presentation.

Student Assessment Strategies

The Research Project Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Research Proposal Presentation - 10%
- Draft Project Proposal - 15%
- Draft research report presentation - 20%
- Final marked report - 50%
- Final corrected report - 5%

A minimum mark of 50% needs to be achieved in order to pass the module.

F4801EG	GROUP DYNAMICS AND LEADERSHIP
Module Title:	Group Dynamics and Leadership
Course Code	F4801EG
NQF Level	8
Notional Hours	80
Additional learning requirements	**None**
Contact Hours	(2 lecture periods per week and 1 Tutorial for a semester)
NQF Credits	9
Prerequisite	Research Proposal and Quantitative Methods in Agribusiness and Economics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The main aim of this module is to expose students to different characteristics of group dynamics and different leadership qualities.

Module Content

The group as channel and instrument in extension; definitions and characteristics of groups; group formation; theories regarding the functioning of groups; group norms; group goals; small group techniques; rural groups and their engagement; definitions and theories of leadership; behaviours and attitude in group work; the extensionist as professional leader; group analysis in group context and process; training of leaders. Conflict resolution, mediation, and negotiation. Ethics in extension and agricultural development. Management in extension; Strategic planning; functions of management; the responsibility of extension worker in leadership development, the emerging pattern of leadership in Namibia.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination of tests, quizzes tutorials and assignments.
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F4831EE	EXTENSION LANDSCAPE AND INNOVATION
Module Title:	Extension Landscape and Innovation
Course Code	F4831EE
NQF Level	8
Notional Hours	180
Additional learning requirements	**None**
Contact Hours	(4 lecture periods per week and 1 Tutorial for a semester)
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The main aim of this module is to introduce students to worldwide challenges, innovation, adoption, and pluralism in Agricultural Extension.

Module Content

Challenges and Advisory Services – Analyse the challenges and propose solutions to address the funding and delivery of agricultural extension. The paradigm shifts in Agricultural Extension functions: Challenges in the governance funding delivery; reduction in public funding and private delivery; cost sharing and cost recovery. Concept of adoption and diffusion: adoption process, stages, rate of adoption on the process, stages; rate of adoption, categories, and elements of adoption and diffusion. Innovation-meaning, characteristics, and steps involved in introducing an innovation in a community. Culture, norms, and diffusion, importance of culture in diffusion, traditional and modern dimensions, social systems, norms, and innovations. Opinion leaders: the two-step flow of communication, the role of change agent in adoption and diffusion in innovations, problems of change agent system, client system and technology. Factors affecting diffusion and adoption of innovations, recent research on adoption and diffusion with special reference to agriculture. Models and theories of diffusion. Changes in rural farming/ livelihoods and their implications; trends in globalization of agriculture and Pluralism sector. Pluralism in addressing diverse needs and development of AIS system and role of extension. EAS providers and their roles and the current reforms in public and private extension system.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination of tests, quizzes tutorials and assignments.
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F4831ED	DIGITAL COMMUNICATION AND TECHNOLOGY
Module Title:	Digital Communication and Technology
Course Code	F4831ED
NQF Level	8
Notional Hours	180
Additional learning requirements	**Group work, projects, and case studies**
Contact Hours	4 lecture periods per week and 2 Practicals for a semester
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to impart students with knowledge and skills of agricultural communication and journalism to effectively shape their communication of agricultural information with agricultural scientists and farmers.

Module Content

Concept of communication in extension; principle of communication in extension, communication process, elements of communication and their characteristics, Models and theories of communication, linear, interactive, and transactional model. credibility, feedback in communication, social networks and barriers in communication, message meaning, dimensions of a message, characteristics of a good message, Message treatment and effectiveness, distortion of message. Methods of communication; Meaning and functions, classification, fforms of communication (Oral and written communication, Non-verbal communication, interpersonal communication, organizational communication), communication methods, audio-visual aids, Key communicators (Meaning, characteristics, and their role in development). Media in communication; role of mass media in dissemination of farm technology, effect of media mix for Rural People, modern communication media. Information and Communication Technology (ICT) in Agriculture; meaning concept, basics of ICTs, global and national status, types of functions of ICTs innovations, meaning of e-Agriculture, e-leaning, advantages and limitation of ICTs. E-Extension initiatives in Agriculture and stakeholders: e-Extension, overview on global and national initiates. Application of ICT in Extension and innovation; Social Media Application to engage audiences.

Learning and Teaching strategies/activities

1. Lectures and Agricultural Extensionist Guest Lectures
2. Guest lecturers
3. Students' presentation
4. Group work
5. Documenting good practices and case study
6. Students interview of ICT practitioner/ Champion

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination of tests, quizzes practicals and assignments.
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

SEMESTER 2

F4832EA AGRIPRENEURSHIP AND VALUE CHAIN DEVELOPMENT

Module Title:	Agripreneurship and value chain development
Course Code	F4832EA
NQF Level	8
Notional Hours	180
Additional learning requirements	**Group work, projects, and case studies**
Contact Hours	4 Lectures + 2 Tutorials / Week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to: equip students with agricultural commodity value chain analytics and agricultural enterprise development knowledge.

Module Content

The Value chain map; meaning of value chain, importance of value chain, types of value chains, governance in value chains, role of extension and other main actors in the value chain, main actors in the value chain, Innovation and upgrading in agricultural value chains; technological, financial, network, Infrastructural innovations, process upgrading, product upgrading, functional upgrading, horizontal, vertical coordination and other types of upgrading, chain upgrading. Entrepreneurship and Opportunity; understanding entrepreneurship, preparing for the entrepreneurship journey, and creating an opportunity. Feasibility Analysis; analysing industry and markets, developing and testing business model, prototyping and validating a solution, protecting start-up assets, building a founding team, and calculating start-up capital requirement. Business Design; preparing a business plan, designing an entrepreneurial company, planning start-up operations, choosing a legal form of organization, developing a start-up marketing plan, and incorporating ethics and social responsibility into the business.

Learning and Teaching Strategies/Activities

1. Lectures/guest Lectures
2. Tutorials
3. Consultations

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination of tests, quizzes tutorials and assignments.
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F4832EE EXTENSION PROGRAMME AND MANAGEMENT

Module Title:	Extension Programme and Management
Course Code	F4832EE
NQF Level	8
Notional Hours	180
Additional learning requirements	None
Contact Hours	4 Lectures + 2 Tutorials / Week
NQF Credits	18
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The main aim of this module is to impart knowledge and skills in the development, execution, and evaluation of situation-specific extension programmes..

Module Content

Principles of a programmed and purposeful Extension. The philosophy, principles, and assumptions of program development. Institutional framework for community participation, ownership, and empowerment; linking with complementary and support services. overview of the program cycle: consideration, survey, planning, action, and evaluation phases. participatory need appraisal problem identification and delimitation; problem conceptualization and development of survey instrument; situation surveys and analysis; formulation of objectives; identification and scheduling of methods and activities; Work plan of calendar construction, budgeting. Types of evaluations and applications. The project management process. Personnel management and administration. Critical analysis of the various agricultural and rural development programmes including NGOs and Self-Help Groups.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination of tests, quizzes tutorials and assignments.
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

F4802EG GENDER AND RURAL DEVELOPMENT

Module Title:	Gender and Rural Development
Course Code	F4802EG
NQF Level	8
Notional Hours	90
Additional learning requirements	None
Contact Hours	(2 lecture periods per week for a semester)
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The aim of this module is to provide students with an understanding of practical approaches and perspectives of Rural and Agricultural and to provide knowledge on issues, challenges, and options facing the sector.

Module Content

Overview of the concepts and theories of rural development including evolution of rural development theories, role of agriculture in rural developments, natural resource base and role of government. Rural livelihood systems focusing on household farming systems, decisions and operation of farming systems, the farm as a social system, nonfarm, off-farm small, micro, and medium enterprises security. Rural institutions including local governance, community based and farmer organizations, agricultural credit and rural finance, input and output markets, the relationship between rural sociology, community development and extension; physical and social structures of communities; cultural relativism; sustainability; indigenous knowledge; social stratification; participatory development methodologies, rural poverty. Gender and Social difference, gender mainstreaming, Gender concepts: empowerment, capacity development, , gender roles, gender analysis, importance of gender in development, gender. Gender in the context with development: concept of gender, gender roles;

. Theoretical approaches and perspective: Women in Development (WID), Women and Development (WAD), Gender and Development (GAD) and Engendering development. poverty and Household Mainstreaming Gender in Economic Development: elements of gender mainstreaming; levels of gender mainstreaming; gender analysis framework; Action plan for economic development; how to develop activity, access, and control profile in an economic enterprise.

Learning and Teaching Strategies/ Activities

- Face-to-face lectures and/or online lectures/activities (pre-recorded or real-time)
- Face-to-face or online tutorials.
- Self-study tasks and assignments

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination of tests, quizzes and assignments.
- A continuous assessment mark of at least 50% is required to gain exam admission.
- One examination with a minimum duration of 3-hours (50% of the final mark).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this course.

E.2.2 DEPARTMENT OF FISHERIES AND OCEAN SCIENCES

E.2.2.1 BACHELOR OF SCIENCE IN FISHERIES AND OCEAN SCIENCES (LEVEL 7)

ADMISSION REQUIREMENTS

Subject to School Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Science in Fisheries and Ocean Sciences** programmes shall apply.

1. Notwithstanding the above, students may be recruited into the Bachelor of Science in Fisheries and Ocean Sciences via two paths:

(i) A pass in five different subjects as follows:
(a) 2 subjects on NSSCAS level with an average d or higher
(b) 3 subjects on NSSCO level with a C or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

Or

ii. A pass in five different subjects as follows:
(a) 3 subjects on NSSCAS level with an average d or higher
(b) 2 subjects on NSSCO level with a D or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

2. Admission criteria based on school leaving certificate prior to 2021 shall be:

i. A pass in five different subjects as follows:
(a) 2 subjects on higher level (NSSCH) with a 4 or higher
(b) 3 subjects on ordinary level (NSSCO) with a C or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

Or

ii. A pass in five different subjects as follows:
(a) 3 subjects on higher level (NSSCH) with a 4 or higher
(b) 2 subjects on ordinary level (NSSCO) with a D or higher
(c) English must be at minimum C at NSSCO level
(d) Five subjects should include Mathematics, Biology, Physics or Chemistry.

Articulation Options

The graduate of this program will articulate into the various NQF level (8) Bachelor of Science qualification honours in related fields (marine science/biology, ocean governance, aquaculture, etc).

PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisites)/ Pre-requisites	Contact hours per week (L/P/T)
Year 1 Core Semester						
U3583AL	Academic Literacy I	5	8	C	None	40 hours
U3403FS	Skills Portfolio	4	0	C	None	
U3583DD	Digital Literacy	4	8	C	None	Sem 0: 4hr/wk Sem 1: 2hr/wk Sem 2: 2hr/wk
F3540IX	Issues in Fisheries and Aquaculture	4	4	E	None	20 hr
F3520ZP	Basic Programming with Python	5	4	E	None	20 hr
Total Credits Core Semester			24			
Year 1 Semester 1						
F3511OL	Introduction to Aquatic Life	5	13	C	None	L (4hr/wk)/p (3hr/Alt wk)
F3511OA	Aquatic Microbiology	5	13	C	None	L (4hr/wk)/p (3hr/Alt wk)
F3511OC	Aquatic Chemistry	5	13	C	None	L (4hr/wk)/p (3hr/Alt wk)
F3511OI	Ichthyology I	5	13	C	None	L (4hr/wk)/p (3hr/ Alt wk)
Total Credits Semester 1			52			
Year 1 Semester 2						

F3532OZ	Mathematics for Natural Sciences	5	14	C	None	L (4hr/wk) /T (2hr/wk)
F3512OB	Biostatistics I	5	13	C	None	L(4hr/wk) /p (3hr/Alt wk)
F3502OF	Freshwater and Intertidal Ecology	5	7	C	None	L (2hr/wk) /p (3hr/Alt wk)
F3512OT	Biochemistry	5	13	C	None	L (4hr/wk) /p (3hr/Alt wk)
F3502OE	Natural Resources Economics	5	7	C	None	L (2hr/wk) /p (3hr/Alt wk)
Total Credits Semester 2			54			
Total credits Year 1			130			

Year 2 Core Semester						
U3683AL	Academic Literacy II	6	8	C	None	40 hours
U3520LP	Leadership Skills	5	2	C	None	10 hours
U3420CN	National and Global Citizenship	4	2	C	None	10 hours
F3610ZR	Introduction to Statistical Programming with R	6	8	C	None	20 hours
F3630OB	Business and entrepreneurship	6	8	C	None	40 hours
Total Credits Core Semester			24			
Year 2 Semester 1						
F3631OB	Biostatistics II	6	15	C	Biostatistics I	L(4hr/wk) /p (3hr/ Alt wk)
F3631OG	Genetics for Aquatic Resources	6	15	C	None	L (4hr/wk) /p (3hr/Alt wk)
F3621OR	Physical Oceanography	6	8	C	None	L (2hr/wk) /p (3hr/ Alt wk)
F3631OY	Ichthyology II	6	15	C	Ichthyology I	
Total Credits Semester 1			53			
Year 2 Semester 2						
F3632OS	Seafood Processing and Quality Control	6	16	C	None	L (4hr/wk) /p (3hr/ wk)
F3632OQ	Aquaculture	6	16	C	Ichthyology I	L (4hr/wk) /p (3hr/wk)
F3632OC	Conservation Biology	6	16	C	None	L (4hr/wk) /p (3hr/wk)
F3622ON	Field Attachment Preparation	6	8	C	None	L (2hr/wk)
Total Credits Semester 2			56			
Year 2 Total Credits			133			
Year 3 Core Semester						
W3750OT	Field attachment	7	24	C	None	22 -25 weeks
Total Credits Core Semester			24			
Year 3 Semester 1						
F3751OM	Fisheries Management	7	16	C	None	L (4hr/wk)
F3751OE	Fisheries and Aquaculture Extension	7	16	C	Aquaculture	L (4hr/wk)
F3751OC	Ocean and Coastal Governance	7	16	C	None	L (4hr/wk)
Total Credits Semester 1			48			
Year 3 Semester 2						
F3742OT	Fishing Technology	7	9	C	None	L(2hr/wk) /p (3hr/ Alt wk)

F3742OP	Production Technology in Aquaculture	7	9	C	None	L(2hr/wk) /p (3hr/ Alt wk)
F3752OP	Dynamics of Aquatic Populations	7	18	C	Biostatistics II	L(4hr/wk) /p (3hr/wk)
F3752OO	Biological Oceanography	7	17	C	Physical Oceanography	L (4hr/wk) /p (3hr/ Alt wk)
Total Credits Semester 2			53			
Year 3 total credits			125			
TOTAL CREDITS FOR THE PROGRAMME			388			

MODULE DESCRIPTORS

FIRST YEAR

F3540IX ISSUES IN FISHERIES AND AQUACULTURE

Module Title: ISSUES IN FISHERIES AND AQUACULTURE
Module Code F3540IX
NQF Level 4
Notional Hours 20
Contact hours 20 Contact hours
Additional learning requirements Field trips, Seminars, and quest lectures
NQF Credits 4
(Co-requisites)Prerequisite None
Compulsory/Elective Compulsory
Semester Offered Core Semester

Module content
Global Aquatic Environment (Freshwater, Brackish water, and Marine Environment) ; Definition of Fisheries and Aquaculture; Overview of Global Fisheries and Aquaculture Production; Important Capture Fisheries and Aquaculture Species; Introduction to Fishing Technology and Aquaculture Systems; Regulations pertaining to Fisheries and Aquaculture (FAO); Fisheries and Aquaculture – African Context; Fisheries and Aquaculture in Namibia; Regulatory Framework of Namibian Fisheries and Aquaculture

Student Assessment strategies
a) Continuous assessment (100% of the final mark) Student assessment in this core module course consists of formative assessment only. Formative assessments consist of assignments (40%), quizzes (40 %), and reports (20%).
b) A final mark of 50% is required to pass this course

F3511OA AQUATIC MICROBIOLOGY

Module Title: AQUATIC MICROBIOLOGY
Module Code F3511OA
NQF Level 5
Notional Hours 130
Contact Hours Lectures: 4 x 1hr/week per semester. Practical: 1 x 3 hr. Alternate week per semester
Additional Learning Requirements Projects, Group and individual assignments
NQF Credits 13
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 1

Module Content
Overview to Microbiology: Microorganisms; Their aquatic environment; Classifications; Their morphology; Structures and chemical composition; The biology of aquatic bacteria; Fungi; Microalgae; Protozoa and viruses; Effects of antibiotics on microorganisms, Important aquatic pathogens of humans and aquatic organisms. The role of aquatic microorganisms: In general industries; food industries and the aquatic ecosystems. The concept of microbiology with reference to: Microscopy; Staining procedure; Sterilization; aseptic; pure culture techniques; Media preparation.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade (i.e., at least 8 assessed practicals (40%), tests [40%], and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 60% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3532OZ MATHEMATICS FOR NATURAL SCIENCES

Module Title: MATHEMATICS FOR NATURAL SCIENCES
Module Code F3532OZ
NQF Level 5
Notional Hours 120

Contact hours	4 Lecture hours / week / semester; 4 Tutorial hours / week / semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content

Ratios and Proportions: Share a given quantity in a specified ratio and use proportion to scale down or scale up quantities given a specific rate. Sets: Definition of a set; notation; equality of sets; subsets; characterization of equality via the subset relation; empty set; Venn diagrams; intersection; union; complement; proofs of simple results on set equality. Standard examples of sets: natural numbers, integers, rationals, and real numbers. Cardinality of sets (examples of finite, infinite, countable, and uncountable sets). Matrix Algebra: Matrices and vectors; principle of matrix multiplication; determinants; minors; cofactors and; transpose matrix; cofactor matrix; adjoint and inverse; Cramer's rule; solution of systems of equation; Gauss-Jordan elimination. Functions: Definition of function; Linear and non-linear function; selected nonlinear functions (exponents and logarithms) and application in the biological field. Calculus: Differentiation and Integration of basic functions. Optimisation: Review of inequalities; Linear; constrained and non-constrained problems: Review of series: Binomial and Geometric; factorial and summations notations. Mathematics applications in fisheries science: Fish feed formulation, international trade conversions; spatial calculations for aquaculture infrastructure; analysis of fish population dynamics; predictive modelling for growth rates; feeding schedules; resource optimization using linear programming; Oceanographic modelling, climate impact assessments; Ecosystem dynamics

Student Assessment Strategies

- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 40%; Examination 60% (1 x 3 hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

  Learning and Teaching Enhancement Strategies
- Internal moderation of examination papers and scripts.
- Peer review of course outlines and teaching.
- Review by Departmental Quality Assurance Committee.
- Student evaluation of teaching and materials.
- Regular reviews of course content and prescribed material.
- Effective supervision and monitoring of assignments; tests and examinations.

P3511PG GENERAL PHYSICS I

Module Title:	GENERAL PHYSICS I
Module Code	P3511PG
NQF Level	5
Notional Hours	140
Contact Hours	Four (4) lectures, a 3-hour practical session every week with a bi-weekly 1-hour tutorial session for one semester.
Additional learning requirements	None
NQF Credits	14
(Co-requisites)Pre-requisites	
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Mechanics: Units, Physical Quantities, and Vectors; Motion Along a Straight Line; Motion in Two or Three Dimensions; Newton's Laws of Motion; Applying Newton's Laws; Work and Kinetic Energy; Potential Energy and Energy Conservation; Momentum, Impulse, and Collisions; Rotation of Rigid Bodies; Dynamics of Rotational Motion; Equilibrium and Elasticity; Fluid Mechanics; Gravitation; Periodic Motion. Waves and Acoustics: Mechanical Waves; Sound and Hearing. Thermodynamics: Temperature and Heat; Thermal Properties of Matter; The First Law of Thermodynamics; The Second Law of Thermodynamics. Practical: Experimental techniques, reading, measuring, uncertainty/error estimation, tabulation of data, graphing, elementary hypothesis verification, practical report writing.

Student Assessment Strategies

- Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes, assignments, and practical reports (at least 6 gradable items).

  A continuous assessment mark of at least 40% is required to gain exam admission.
- One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A final mark of 50% is required to pass this module.
- To qualify for a Supplementary Exam a final mark of 45—49% is required, subject to a subminimum of 40% in the Exam.

F3511OL INTRODUCTION TO AQUATIC LIFE

Module Title:	INTRODUCTION TO AQUATIC LIFE
Module Code	F3511OL
NQF Level	5
Notional Hours	130
Contact hours	Lectures: 4 x 1h/week per semester. Practicals: 1 x 3 hr alternate week per semester
Additional learning requirements	Practical sessions will involve sampling to introduce students to the different aquatic life forms
NQF Credits	13

(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction to biodiversity: Definitions and Concepts; Scales of Biodiversity; Threats to Biodiversity. Classification and naming of Species: Systems of classification; Scientific names; Nomenclature. The Kingdoms of Life: Animalia; Plantae; Fungi; Protista and Monera. The Aquatic flora of Namibia: The major algal groupings of the Benguela(form and function. The Aquatic Fauna of Namibia: The major animal phyla of the Benguela (form and function). Exploitation and Conservation: The value of biodiversity; the economic benefits of aquatic life; Factors affecting biodiversity loss; Society and biodiversity.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 60% of the module grade (i.e., at least 8 assessed practical reports (40%], 2 tests [30%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 40% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3511OI ICHTHYOLOGY I

Module Title:	ICHTHYOLOGY I
Module Code	F3511OI
NQF Level	5
Notional Hours	130
Contact Hours	Lectures: 4 x 1h/week per semester. Practicals: 1 x 3 h alternate week per semester
Additional learning requirements	Practical sessions will involve sampling to introduce students to the different fish species
NQF Credits	13
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Fish biosystematics: Phylogeny and classification methods; Overview of the fish evolution including the major groups of extinct fish species. Description of external anatomy and variations of fish body forms: Morphometric indices; Identification and description of major groups of living fish species; agnatha (myxinoidei and petromyzontoidei); Chondrichthyes and Osteichthyes; the use of skin; Colouration; Camouflage; Scale formation in fish identification; Use of external fish external features in fisheries taxonomy (Meristics and Morphometric features); Namibian marine and freshwater fish diversity.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module and a summative assessment (end of semester examination) 60% (1x 3 hours theory paper). The pass mark for the module is 50%.

F3512OB BIOSTATISTICS I

Module Title:	BIOSTATISTICS I
Module Code	F3512OB
NQF Level	5
Notional Hours	130
Contact Hours	Lectures: 4 x 1h/week per semester. Practicals: 1 x 3 h alternate week per semester.
Additional learning requirements	Practical and group discussion sessions.
NQF Credits	13
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Introduction to biostatistics and its concepts: Definition of Biostatistics; Population and sample; Branches of statistics (descriptive and inferential); Variables and data. Data collection: Learning about the three methods for collecting biostatistics data; experimentation; survey and observation; introducing sampling and probability sampling techniques. Presentation of data: Purpose for presenting data; Tables and graphs including x-y plots and their meaning; Suitability of each presentation method; Interpretation of data linking with specified research objectives; introduction to MS Excel and using spreadsheets as well as data cleaning and data presentation will be done; students are required to tackle presentation of data using MS Excel. Random variables- Measures of central tendency and variability: Mode; mean; median and quartiles for both grouped and ungrouped data; Standard deviation; coefficient of variation; signal to white noise ratio, standard error; inter-quartile range and range of grouped and ungrouped data; Emphasis will be on the interpretation of the measures. Introduction to probability: Set theory, Probability theory including Bayesian law (conditional probability); Combinatory analysis (permutations and combinations); applications to biological data. Discrete probability distribution models: Binomial; Geometric and Poisson models. Continuous probability distribution models: Normal/Gaussian distribution and its percentage points; t-distribution. Point and interval estimation: Standard error and confidence intervals. Proportions and sample surveys: Constructing surveys; Sample size determination. A brief introduction to hypothesis testing: Ingredients to a test of hypothesis and basic stages in hypothesis testing; Examples using Z-test and normal distribution table

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade (i.e., at least 8 assessed practicals including spreadsheet and/or statistical software use [60%], 1 practical-

based test [20%] and 2 assignments, assessed as written, oral or poster [20%]) and a summative assessment (end of semester examination) 50% (1x 3 hours' theory paper). Pass mark for the module is 50%

F3511OC	AQUATIC CHEMISTRY
Module Title:	AQUATIC CHEMISTRY
Module Code	F3511OC
NQF Level	5
Notional Hours	130
Contact hours	Lectures: 4 x 1hr/week per semester . Practicals: 1 x 3 hr alternate week per semester
Additional learning requirements	Practical and group discussion sessions.
NQF Credits	13
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction to water: definition of concepts, global water cycle, the water molecule, different states of water and energy transfers, Chemical structure of water: structure of water in biological systems, hydrogen bonding. Unique properties of water: description of properties of water i.e., High heat of vaporization, versatile solvent, surface tension, high specific heat, density. Physical and chemical parameters: Temperature, pH, salinity, alkalinity, hardness and acidity; Dissolved gases in water: solubility, Henry's Law, Nutrients and nutrient cycles: phosphorus, nitrogen, sulphur, iron and manganese; silicon and other micro-nutrient constituents, decomposition of organic matter; Aquatic pollution: Toxicity limits of various pollutants and impact on aquatic life, water body remediation strategies, wastewater treatment. Water Quality instruments: Instrumentation and methods of measurement of water quality parameters.

Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. The Final CA mark [60%] from formative assessments constitutes; two (2) CA tests (40%), Practicals (15%) and Assignments/Essays (20%), quizzes (5%) and a summative assessment (end of semester examination) [60%] (1x 3 hours theory paper). Pass mark for the module is 50%.

F3502OF	FRESHWATER AND INTERTIDAL ECOLOGY
Module Title:	FRESHWATER AND INTERTIDAL ECOLOGY
Module Code	F3502OF
NQF Level	5
Notional Hours	70
Contact hours	Lectures: 2 x 1h/week per semester . Practicals: 1 x 3 h alternate week per semester
Additional learning requirements	Practical sessions will involve sampling to introduce students to the different aquatic life forms
NQF Credits	7
(**Co-requisites) Prerequisite**	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to Freshwater and Intertidal Ecology. Abiotic parameters influencing productivity of aquatic systems. Diversity, structure and functioning of the various community structures: phytoplankton; zooplankton and benthos. Direct and indirect interactions between the biotic and abiotic components of the aquatic systems: Lakes and ponds rivers and other lotic water systems; estuary; ocean. Functional webs: influence of competition, Predation and symbiosis and commensalisms on community structure. Reproduction tactics: Growth: survival and fecundity of producers and consumers.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade (i.e., at least 8 assessed practicals (40%], 3 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 60% (1x 2 hours theory paper). Pass mark for the module is 50%.

SECOND YEAR

F3631OG	GENETICS FOR AQUATIC RESOURCES
Module Title:	GENETICS FOR AQUATIC RESOURCES
Module Code	F3631OG
NQF Level	6
Notional Hours	150
Contact Hours	Lectures: 4 x 1 h/week per semester. Practical: 1 x 3 h alternate week per semester
Additional Learning Requirements	Projects, Case studies, Group, and individual assignments
NQF Credits	15
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Mendelian principles: Lcope; Limitation; Modifications to Mendelian ratios; Multiple alleles; Epistasis. Practical: Exercises on Mendelian laws; Multiple alleles; Epistasis; Gene and genotype frequencies; Linkage and crossing over; Estimation of gene

and genotype frequencies and other genetic parameters. Chromosome theory of inheritance: Genetic variation; Causes and measurement; Linkage and crossing over; Recombination; and Interference. Cytogenetics: Cytogenetics and Evolution; Karyotyping and banding; Genetic basis of sex determination. Chromosome manipulation: Ploidy induction; Sex reversal, Gynogenesis and androgenesis. Modern concept of gene: DNA as genetic material; Genetic code and potein synthesis, Transfer and regulation of genetic information. Introduction to recombinant DNA technology: Restriction enzymes; Vectors; genetic transformation; and genomics. Basic concepts of Population Genetics: Individual vs population; Gene and genotype Frequency and factors affecting them. Genetic basis of selection: Qualitative vs quantitative traits Pleiotropy; Penetrance; Application of selection for performance improvement; Concept of inbreeding and its management. Mutation: natural and induced mutagens; Fate of mutant allele in the population; Cross-breeding and genetic drift. DNA Genetic Markers and Their Application: Genetic Markers; Definition and Basic Types; DNA Markers and Methods of Molecular Genetics; Types of DNA Markers; Application of DNA Markers in Aquaculture and Fisheries. Bioinformatics: in fish genetics and breeding. Fish Genome: Zebra fish genome; Fish as genetic model.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 60% of the Module grade (i.e., at least 8 assessed laboratory practical work [40%], 3 x tests [20%], and 2 assignments, assessed as written [30%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 40% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3611SG	GENERAL MICROBIOLOGY
Module Title:	GENERAL MICROBIOLOGY
Module Code	F3611SG
NQF Level	6
Notional Hours	150
Contact hours	Four (4) hours contact lecture per week and 1 x 3 hours practical session every two week for one semester
Additional learning requirements	Field work
NQF Credits	15
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content
This course provides students with a general overview of microbiology. The first part covers a historical perspective of microbiology; how microorganisms were discovered; ancient experiments, theories and myths. The second chapter deals with their classifications; the chronology of methods used and the diversity of environments where microorganisms are found. The third chapter covers the morphology of prokaryotic microorganisms; their structures and chemical composition and subcellular organelles. The fourth chapter discusses the role of microorganisms in nature; in biogeochemical cycles (carbon and nitrogen cycles; and their application in industries will be discussed. The fifth chapter describes the morphology, biology and habitats of eukaryotic microorganisms; fungi, algae, protozoa and viruses will be studied. The sixth chapter is a synopsis of methods to control microbial growth will be given; differentiating and highlighting various physical and chemical control methods and their respective efficacies; with direct reference to the effect of antibiotics on microorganisms including their basic classification and mode of action. The seventh chapter is an overview of the important pathogens of plants and animals; common pathogens affecting livestock and crops in the tropics will be selected and discussed; fair coverage of various groups; bacteria, fungal and viral pathogens will be made; the characteristics of the causative agents; conducive conditions for their transmission and control measures will be given. The practical aspects of this module will cover, media preparation and sterilization, aseptic and pure culture techniques, microbial isolation and identification including microscopy, staining techniques, and biochemical tests. The antibiotic sensitivity assays will also be covered.
Learning and Teaching Strategies/Activities
Teaching and learning will be carried out through the following methods: lectures, practical sessions, consultations, written assignments, field work, and presentations.

Student Assessment Strategies
Assessment activities will comprise of formative assessments (50% of the final mark), comprising of at least three tests, forum discussions, practical reports and written assignments). One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.

F3631OY	ICHTHYOLOGY II
Module Title:	ICHTHYOLOGY II
Module Code	F3631OY
NQF Level	6
Notional Hours	160
Contact Hours	Lectures: 4 x 1h/week per semester . Practicals: 1 x 3 h/week per semester
Additional Learning Requirements	Projects, practical sessions, exercussions, Group and individual assignments.
NQF Credits	16
Prerequisite	Ichthyology I (F3511OI)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction to fish biology and internal anatomy. Respiration: Structure and function of gills; Mechanism of gaseous exchange; Adaptation for air-breathing in lungfishes. Feeding and digestion: Structure and functions of alimentary canal; Food and feeding habits. Salt and water balance: Structure and functions of excretory organs; Osmoregulation; Salt and

water balance in marine; Freshwater and elasmobranch fishes. Movement and body structure: Skeleton; Muscle and swimming mechanism; Static and dynamic lift; and Buoyancy mechanisms in fish. Reproduction: Structure and functions of gonads; Gamete formation and reproductive strategies; Fish endocrinology and hormonal control. Introduction to fish genetics.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade and a summative assessment (end of semester examination) 60% (1x 3 hours theory paper). The pass mark for the module is 50%.

F3502OE	NATURAL RESOURCE ECONOMICS
Module Title:	NATURAL RESOURCE ECONOMICS
Module Code	F3502OE
NQF Level	5
Notional Hours	70
Contact Hours	Lectures: 2 x 1h/week per semester. Practicals: 1 x 3 h alternate week per semester
Additional Learning Requirements	Projects, exercussions, Group and individual assignments.
NQF Credits	7
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to natural resources economics: Definitions and economics concepts; scarcity; Opportunity cost and production possibility frontier;The role of economics in natural resources. Classification of natural resources: Types of natural resources; Renewable resources; Non-renewable resources; Natural and man-made capital. Property rights and natural resource use: Describe property rights; Characteristics of property rights; Property rights and resource use; The tragedy of the common concept; Sustainability of natural resources: Sustainability; Resource scarcity and population growth; Conservation and development; Brundtland report; Historical development of sustainable development; Operationalisation of the sustainable development concept; Indicators for sustainability analysis. Decision making and resource use: Positive and normative economics; Cost-benefit analysis. Natural resource and economic efficiency: Static and dynamic efficiency; Compounding and discounting.Externalities/market failures in resource use and production: Public goods; Forms and types of externalities; Causes of externalities; Dealing with externality issues; Public goods. Guiding principles in resources use: Precautionary principle; Polluter pay principles; Calculus of negligence principle; Subsidiary principle; User pay principle; The application of principles in the use of natural resources. Economic valuation of natural resources products and services: Eco-centric vs. anthropocentric approach; Why value natural resources; Procedures of economic valuation of natural resources; Total Economic values associated with natural resources. Valuation techniques and surrogate markets: Direct and indirect techniques; The contribution of natural resources to the national economy: The role of natural resources in the economy.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade consisting of a combination of tests, quizzes, assignments and practical reports (at least 5 gradable items). Summative assessment (end of semester examination) 50% (1x 2 hours' theory paper). Formative assessments will be moderated internally while summative assessment will be moderated externally. Pass mark for the module is 50%.

F3632OC	CONSERVATION BIOLOGY
Module Title:	CONSERVATION BIOLOGY
Module Code	F3632OC
NQF Level	6
Notional Hours	160
Contact Hours	Lectures: 4 x 1h/week per semester . Practicals: 1 x 3 h / week per semester
Additional Learning Requirements	Projects, Case studies, Group and individual assignments.
NQF Credits	16
Prerequisite	Freshwater and Intertidal Ecology (F3522OF)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Foundations of Conservation Biology: Introduction to module; State of our planet. Rise of Conservation Biology: Ethics and conservation; Biodiversity concepts and measurement; Estimating biodiversity; Global patterns and drivers of diversity Island biogeography. Importance of Biodiversity: The values of biodiversity; Biodiversity and ecosystem functioning; Biodiversity and ecosystem services. Ecological economics Hedonic pricing: Environmental economics and sustainable development. Threats to Biodiversity: Extinction; IUCN Red List; Habitat loss Meta-population dynamics; Habitat fragmentation and degradation. Overexploitation: Sustainable harvest models; Invasive alien species; Climate change. Approaches to Conservation: Conservation of genetic diversity; Effective pop size. Conservation of species populations: Population viability analysis; Conservation of communities and ecosystems. Managing landscapes and networks: Designing terrestrial and marine reserves; Ex situ conservation; Restoration and resurrection. The future of conservation: Agenda for the future.

Student Assessment
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade (i.e., at least 8 assessed practicals (40%], 2 tests [40%] and 2 assignments, assessed as written [10%]) and

seminar presentation [10%]) and a summative assessment (end of semester examination) 60% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3632OQ	AQUACULTURE
Module Title:	AQUACULTURE
Module Code	F3632OQ
NQF Level	6
Notional Hours	160
Contact Hours	Lectures: 4 x 1h/week per semester. Practicals: 1 x 3 h/ week per semester
Additional Learning Requirements	Projects, Case studies, Group and individual assignments, Study site visit
NQF Credits	16
Prerequisite	Ichthyology I (F3511OI)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to Aquaculture: History of aquaculture development; Global aquaculture production statistics and future trends; Aquaculture development in Namibia. Types of aquaculture systems: Extensive; Semi-intensive; Intensive; and Super-intensive systems; open, semi-open and closed systems; Pond designs. Aquaculture feability studies: Site and species selection for aquaculture; Impact of aquaculture systems on the environment; regulations governing aquaculture practices. Environmental factors affecting aquaculture productivity: Water quality; Soil types; Aquatic macrophytes. Aquaculture practices and management: Stocking; Broodstock management and larval rearing of important aquaculture species. Feed and feeding in aquaculture: Introduction to aquaculture nutrition and feed formulations; Aquatic animal nutrition; Feed manufacturing methods and practices. Aquaculture Business Planning: Feasibility study; Development of aquaculture business; Marketing and financial plan. Aquaculture animal diseases: Identification; Treatment, Control and prevention.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade (i.e., at least 8 assessed laboratory practical work (40%], 3 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 60% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3622ON	FIELD ATTACHMENT PREPARATION
Module Title:	FIELD ATTACHMENT PREPARATION
Module Code	F3622ON
NQF Level	6
Notional Hours	80
Contact Hours	Lectures: 2 hrs./ week per semester
Additional Learning Requirements	None
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Guides on how to get specific job and skill experience during field attachment. Employability-enhancing activities: Guide students on how to gain experience; expand your network of company or industry contacts. Professional behavior and/or knowledge: prepare students on expectations for workplace behaviors and specific common job norms. Guide on effectiveness of field-based learning. Demonstration and discussion of ethical awareness, the ability to do ethical reflection, and the ability to apply ethical principles in decision-making. Capacities and skills for ethical and moral decisions making. Students should develop, demonstrate and act out their ethical abilities.

Student Assessment Strategies
Student assessment for this module will consist of formative tasks, and the final mark will be made of 100% Continuous Assessment (CA). The CA will be made up seminars (20 %) and field-based learning plan (80 %).

THIRD YEAR

F3752OO	BIOLOGICAL OCEANOGRAPHY
Module Title:	BIOLOGICAL OCEANOGRAPHY
Module Code	F3752OO
NQF Level	7
Notional Hours	170
Contact Hours	Lectures: 4 x 1 h/week per semester; Practical: 1 x 3 h alternate week per semester
Additional Learning Requirements	Projects, Practical sessions, Group and individual assignments, Study site visit
NQF Credits	17
Prerequisite	Physical Oceanography (F3621OR)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Introduction to Biological Oceanography: Definitions and concepts; History of biological oceanography. Light in the Ocean: Major source of energy; Transmission and absorption; Light dependent biological processes. Nutrients in the Ocean: Essential nutrients; Eources of nutrients; Importance and availability, Conservative and non-conservative constituencies of seawater. Dynamics: Phytoplankton growth and models; Sverdrup Paradigm; Bacteria and Algae: Classification systems; Sampling methods; Morphology and life cycle; Economic value. Zooplankton: Definitions; Classification; Morphology; Identification and Ecological and Economic importance. Marine Ecology: Ocean habitats; Classification of organisms; Basic ecology; Selected adaptive strategies. Biological Productivity in Oceans: Food webs and trophic dynamics; General marine productivity; Biological productivity of upwelling systems. Special Biotopes: estuaries and fjords. Oceanographic instrumentation: Types and uses; application; interpretation of data; report writing.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade (i.e., practical, 2 tests and 2 assignments, and seminar presentation) and a summative assessment (end of semester examination) 60% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3751OM	FISHERIES MANAGEMENT
Module Title:	FISHERIES MANAGEMENT
Module Code	F3751OM
NQF Level	7
Notional Hours	160
Contact Hours	Lectures: 4 x 1 h/week per semester
Additional learning requirements	Site visits, Case studies, Group and individual assignments
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction to Fisheries Management: Definitions and concepts; Goals and objectives of Fisheries management; Principles of fisheries management; Fisheries management process. A short history of fishing and fishery management: The earliest evidence of fishing and seafood; Emergence of commercial fishing in antiquity; The marine fishing revolution of the Middle Ages; Fishery globalization in the nineteenth century and the first indications of decline; Beginnings of fisheries research in the late nineteenth century; In the twentieth century; Fishing intensified and there was an increased awareness of the need to manage fisheries. Introduction to theories of organisation: Management organisation and its function; Fisheries management Institutions; Legal framework in Namibia (Legal framework & international convention). State of world fisheries: Trends in world fisheries; State of capture and aquaculture fisheries; State of fisheries in Namibia; international developments strengthening fisheries; fisheries in crisis. Management and decision making: Fisheries planning; fisheries management plans; Sustainable fisheries management; Co-management; Issues in fisheries management; Politics in fisheries. Fisheries regulations: Input; Output and technical regulations. Enforcement of fisheries regulations: Monitoring; Control and Surveillances; Other participatory methods. Management costs: Types of fisheries services. Fishery sector: Subsistence artisanal vs. industrial and commercial fisheries. Livelihood approaches to fisheries and lesson from SADC: Fisheries and poverty; Gender roles in fishery; Diseases; Pandemics and fisheries communities.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 100% of the Module grade (Minimum of 2 tests, a marked assignment and seminar presentation). All assessments will be internally moderated. Pass mark for the module is 50%.

F3751OE	FISHERIES AND AQUACULTURE EXTENSION
Module Title:	FISHERIES AND AQUACULTURE EXTENSION
Module Code	F3751OE
NQF Level	7
Notional Hours	160
Contact Hours	Lectures: 4 x 1 h/week per semester
Additional Learning Requirement	Site visits, Case studies, Group and individual assignments
NQF Credits	16
Prerequisite	Aquaculture (F3632OQ)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Extension concepts: Definition and importance of program extension; Principles and theories. Extension methods:; Modern and Traditional Extension; Fisheries and aquaculture extension as adult learning;;; Philosophy and principles of program development in extension; Comparing aquacultural extension approaches (FSRE); Science and Indigenous knowledge systems and participatory appraisal techniques; Social change and innovation; Attributes of Innovations and their rate of adoptions; Elements in diffusion of Innovations; Motivational theories; Community participation and involvement in extension, PRA methodologies and techniques; Improving the organisation and management of extension; Establishing and strengthening fishermen and fish farmer's organisations.

Student Assessment Strategies

Student assessment for this module will only consist of formative tasks, which will make up 100% of the module grade. Assessment includes at least eight (8) practicals which contribute 40%), 3 tests (40%) and 2 assignments, assessed as written (10%) and seminar presentation (10%). The pass mark for the module is 50%.

W3750OT	FIELD ATTACHMENT
Module Title:	FIELD ATTACHMENT
Module Code	W3750OT
NQF Level	7
Notional Hours	240
Contact hours	Minimum 22 weeks and maximum 25 weeks
Additional Learning Requirement	Site visits, Case studies, Report writing
NQF Credits	24
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core and 1

Module Content
Students will be attached to selected institutions for hands-on experience in assigned areas of subject specialization. The students will apply the principles and techniques theoretically learnt to real-life problem-solving situations. A project-based learning programme will also be developed for each student on attachment.

Student Assessment Strategies
A combination of 40 % Field report and 40 % report presentation will make up the 80 % of this module grade. 20 % of the subject grade is subject to satisfactory attendance and good conduct during attachment.

F3630OB	BUSINESS AND ENTREPRENEURSHIP
Module Title:	BUSINESS AND ENTREPRENEURSHIP
Module Code	F3630OB
NQF Level	6
Notional Hours	80
Contact Hours	Lectures: 2 x 1hr/week per semester
Additional learning requirements	Case studies (development of a business plan in the sphere of Fisheries and Ocean Sciences)
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
Introduction to Business and Innovation: Definitions and concepts; Goals and objectives of a business; Research and innovation. Creativity: The creative process; Steps in the creative process; Traits of creative people; Barriers to creativity. Innovation: Innovation dilemma; Types of innovation; innovation process; Benefits of innovation; Source of innovation; Major innovation myths; The role of technology to innovation. Entrepreneurs: Entrepreneur theory; Types of entrepreneurs; entrepreneurship process; Common characteristics of entrepreneurs. Local and international framework supporting business development: In Namibia; Namibia Chamber of Commerce and Industry; Ministry of Industrialization; Trade and SME Development; Ministry of Sport; Youth and National Service; Development Bank of Namibia; National policies and others. International: SACU. Case studies: Analysis of different business entities; Assess the strengths; Weaknesses; Threats and opportunities of such businesses; New business ventures. Business feasibility factors: Management; Marketing; Production and services; Financial; Laws (labour, etc.); regulation; Standards; Business codes; Political and economies; Challenges facing businesses and societies; Steps to problem-solving. Business plan: Outlines and description; The process for developing a business plan; Criteria of a good business plan. Investors: Types of investors; What factors do investors consider when deciding whether to support a business or an idea; presenting a business plan to investors. Develop a business innovation project: identify a product/service to be developed; Writing a business plan; present the business plan.

Student Assessment Strategies
Student assessment for this module will only consist of formative assessments which will make up 100% of the module grade (Minimum of 2 tests: 20%, a marked assignment (business plan which will be assessed throughout its development stages: 60%) and seminar presentation: 20%)). All assessments will be internally moderated. The pass mark for the module is 50%.

F3752OP	DYNAMICS OF AQUATIC POPULATIONS
Module Title:	DYNAMICS OF AQUATIC POPULATIONS
Module Code	F3752OP
NQF Level	7
Notional Hours	180
Contact Hours	Lectures: 4 x 1 h/week per semester; Practical: 1 x 3 h per week per semester
Additional learning requirements	Group discussions, Practical sessions, Group and Individual assignments
NQF Credits	18
Prerequisite	Biostatistics II (F3631OB)
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Concepts in Fisheries Science: Fisheries development; Fisheries of the world; Examples of exploited populations in Namibia; Why study fish population dynamics? Why manages fisheries? Fishery-dependent data: CPUE and fishing effort, Catchability; Standardizing CPUE Fishery-independent data: Concept of population and unit stock; Basic sampling designs; Methods of abundance estimation; Visual census methods; Mark-recapture methods; Acoustic methods; Swept-area surveys; Fish distribution in space and time (distribution and migration). Harvesting renewable resources: Population dynamics and harvesting renewable resources basic equation; Life history of a fish population Recruitment: Factors affecting recruitment; Stock-recruitment relationships and density dependence. Growth and size relationships: Factors affecting growth; Body size relationships; Von Bertalanffy growth model; Length-weight relationship. Mortality: Natural mortality; Factors affecting natural mortality; Fishing Mortality; Impact of fishing mortality on populations and communities (including bycatch). Life-history strategies: r- and K-strategists; Fishing strategies in relation to LH strategies. Biological data: Calculations of catch composition; Otolith studies; age and growth; Length measurements and length-frequency distribution; Population age structure and cohorts; sex and gonad stage; maturity; maturity ogives and phenology. Decision tools and reference points: The decision-making process; The stock assessment process; Reference points; and Ecosystem indicators.

Student Assessment
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade (i.e., at least 8 assessed practicals including spreadsheet and least squares regression modelling – testing specific learning outcomes - as well as paper-reading and discussion exercises and essays arguing pros and cons of certain scenarios [60%], 1 practical-based test [20%] and 2 assignments, assessed as written, oral or poster [20%]) and a summative assessment (end of semester examination) 50% (1x 3 hours' theory paper). Pass mark for the module is 50%.

F3632OS	SEAFOOD PROCESSING AND QUALITY CONTROL
Module Title:	SEAFOOD PROCESSING AND QUALITY CONTROL
Module Code	F3632OS
NQF Level	6
Notional Hours	160
Contact Hours	Lectures: 4 x 1hour/week per semester; Practical: 1 x 3 hr alternate week per semester
Additional Learning Requirements	Group and individual assignments, Laboratory practices
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Fish composition: Morphological structure of fish; Fish muscle structure and chemical composition; Relate fish structure and handling to the quality; structure; and composition of edible portions of crustaceans and bivalve mollusks; relate fish composition to human nutrition. Fish capture technologies and classifications: Common fishing method; Their target species; Impacts on the aquatic system and seafood quality. Preliminary fishing operations: Purpose of preliminary operations in fisheries; Types of operations and technology/equipment used thereof (grading, washing, de-heading, gutting, evisceration, scaling, skinning, filleting); Effect of these operation on product quality. Fish chilling and freezing technologies: Relate the need for fish chilling and freezing; Process of fish chilling and freezing including related equipment used; Effect of freezing on fish quality; Individual quick-freezing methods (IQF) and IQF fish products; Fish glazing. Sea foods processing plants hygiene: Cross contamination in sea foods plants; hygienic requirements, water (UV treatment, chlorination), hygienic production and use of Ice; selection of equipment and utensils; personnel hygiene; Organized cleaning schedules with required cleaning steps and verification. Quality evaluation of sea foods: factors affecting microbiological quality of sea foods; Major degradative processes occurring during storage of fish and fish products; Use of standardized sensory evaluation schemes/indicators for evaluating fish freshness/quality; Use of chemical/biochemical; and microbiological parameters in evaluating fish freshness/quality; Marine toxins and seafood-borne illness (finfish and shellfish poisoning). Fish packaging: Type of packaging and seafood product quality; Modified Atmospheric Packaging (MAP); Product traceability; Seafood frauds (mislabeling, seafood substitution, short-weighting). Fish processing: Production line planning. Main principles and processing/preservation techniques: Drying; Salting; Smoking; Canning, Surimi technology; Concentrated fish proteins; Caviar processing; Battered and breaded fish products; Extruded fish products; Processing of fish meal and fish oils; Use of fish by-products, modern techniques used in the processing of mollusks and crustaceans.

Student Assessment
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 60% of the Module grade (i.e., at least 8 assessed practicals (40%], 3 x tests [20%], 2 assignments assessed as written [30%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 40% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3512OT	BIOCHEMISTRY
Module Title:	BIOCHEMISTRY
Module Code	F3512OT
NQF Level	5
Notional Hours	130
Contact hours:	Lectures: 4 x 1hour/week per semester; Practical: 1 x 3 hr alternate week per semester
Additional Learning Requirements	Group and individual assignments, Laboratory practices
NQF Credits	13
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Structural Biochemistry: Structure and function of macromolecules (carbohydrates, proteins and lipids); Vitamins; Coenzymes and Cofactors. Enzymology: (Enzymes as organic catalysts; Enzyme nomenclature; Factors affecting activities of enzymes; Enzyme kinetics The Michaelis-Menten equation; The Lineweaver-Burk plot; Enzyme inhibition; Allosterism. Bioenergetics and Thermodynamics: Free Energy; Laws of Energy; Activation Energy; Transition States; Endergonic and exergonic reactions. Metabolism: Catabolism and Anabolism; Carbohydrate catabolism (Glycolysis, Alcohol and lactic acid Metabolism; Tricarboxylic acid cycle or the TCA cycle; Electron transport chain and oxidative phosphorylation); Regulation of carbohydrate metabolism; Gluconeogenesis; Synthesis of the disaccharides (lactose and sucrose); Lipid metabolism (β-oxidation, malonly CoA); Integration of carbohydrate and fat metabolism; Amino acids and protein metabolism; Urea cycle; The Cori cycle; Pentose phosphate pathway. Spectrophotometry: Fundamental laws of spectrophotometry and absorbance.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade (i.e., at least 4 assessed practicals [40%], 2 tests [50%] and 2 assignments/quizzes [10%]) and a summative assessment (end of semester examination) 60% (1x 3 hours' theory paper). Pass mark for the module is 50%.

F3751OC OCEAN AND COASTAL GOVERNANCE

Module Title:	OCEAN AND COASTAL GOVERNANCE
Module Code	F3751OC
NQF Level	7
Notional Hours	160
Contact Hours	Lectures: 4 hours/ week
Additional Learning Requirements	None
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
National and International legal frameworks: United Nations Law of Sea (UNCLOS), Benguela Current Convention (BCC), the Environmental Management Act (2007) and other international legislations and conventions supporting Ocean and coastal governance. Marine Pollution: Marine pollution definition: types and environmental impacts; Oil pollution and impact of oil spill; Heavy metals: dangers and hazards Wastes: solid garbage and liquid sewage; Pollution risks from ships: International Convention for the Prevention of Pollution from Ships (MARPOL). Marine Protected Area (MPA): the issues, challenges, and opportunities, including a focus on the design, implementation, and evaluation of marine protected areas. Blue economy: understanding the concept towards achieving the sustainable use and conservation of Ocean. Coastal zone management: Principles, approaches, processes and issues related to integrated coastal and Ocean management. Marine Spatial Planning (MSP): This topic introduces the concept of MSP and how it can be used to attain blue growth. Environmental impact assessment (EIA) and strategic environmental assessment (SEA): This topic introduces the concept of SEA and EIA as a planning and governance tool.

Student Assessment Strategies
Student assessment for this module will consist of formative tasks, and the final mark will be made of 100% Continuous Assessment (CA). The CA will be made up of Assignments (20%), tests (40%)], and case studies (40 %). The pass mark for the module is 50%.

F3742OT FISHING TECHNOLOGY

Module Title:	FISHING TECHNOLOGY
Module Code	F3742OT
NQF Level	7
Notional Hours	90
Contact Hours	Lectures: 2 x 1hour/week per semester; Practical: 1 x 3 hr alternate week per semester
Additional learning requirements	Site visit: Company that manufactures fishing equipment's (net)
NQF Credits	9
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Fishing gear and techniques: Definitions and concepts, historical overview of fishing technology, classification of fishing gear, development of fishing gear and methods, Factors that influence fishing gear and methods of selection. Design and gear technology: The design process, fishing gear designs, marine and freshwater fishing gear and technologies. Fish aggregating- and selective devices: Importance of fish selectivity, selectivity of fishing gears, selectivity influencing factors. Impact of fishing gear on the environment: Bycatch, discards, and over-fishing, ecological impacts on aquatic ecosystems/communities, benthic habitats, effects of fishing gear/methods on the quality of aquatic resources (during harvesting). Adaptation of appropriate technology: Fish finding equipment's and operation, sustainable gear/methods for eco-friendly fishing, gear regulations and international standards. Fishing gear research and development: The future of fishing gear technology, challenges in fishing gear technology and sustainability, current research in fishing gear technology and innovation.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade (Minimum of 2 tests, 2 marked assignments and 1 field report). Summative assessment (end of semester examination) 50% (1x 2 hours' theory paper). Formative assessments will be moderated internally while summative assessments will be moderated externally. The pass mark for the module is 50%.

F3631OB	BIOSTATISTICS II
Module Title:	BIOSTATISTICS II
Module Code	F3631OB
NQF Level	6
Notional Hours	150
Contact Hours	Lectures: 4 x 1 h/week per semester; Practical: 1 x 3 h alternate week per semester.
Additional learning requirements	Practical and group discussion sessions.
NQF Credits	15
Prerequisite	Biostatistics I (F3512OB)
Compulsory/Elective	Compulsory
Semester Offered	1

Module content

Inferential biostatistics for one or two populations: Revision of basic stages in hypothesis testing; T-tests and Z-tests for both paired and independent samples. Regression and correlation: Correlation methods; Pearson's correlation coefficient; coefficient of determination and non-determination and scatter-gram; Simple linear and regression using the Least Squares Technique. Introduction to experimentation and multiple population inferences: Principles of experimentation; CRD; RCBD; Factorial design ANOVA; Latin square design: Replicated and non-replicated; Statistical analysis; Split Plot design; Mathematical model for each design; ANOVA assumptions, Test for the violation of assumptions; Correcting violation and interpretation; Post hoc methods using SPSS: e.g. Mean Significant difference. Chi-square test of association and Goodness of fit: The chi-square distribution; Goodness of fit; n x n contingency tables. Social Survey methods: Definition of survey, Planning and designing surveys; how to carry surveys; sampling size issues; Yaro Yamane formula for sample size determination Craig, 2016; Sampling methods (Probability and non-probability methods); Questionnaire design; wording the questions; Response format scale reliability and validity and checks; Preparation of code book; coding open ended question; Cronbach's Alpha test.

Student Assessment

Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade (i.e., at least 8 assessed handins including spreadsheet and/or statistical software use [60%], 1 test [20%] and 2 assignments, assessed as written, oral or poster [20%]) and a summative assessment (end of semester examination) 50% (1x 3 hours' theory paper). Pass mark for the module is 50%.

F3742OP	PRODUCTION TECHNOLOGY IN AQUACULTURE
Module Title:	PRODUCTION TECHNOLOGY IN AQUACULTURE
Module Code	F3742OP
NQF Level	7
Notional Hours	90
Contact Hours	Lectures: 2 x 1hour/week per semester; Practical: 1 x 3 hr alternate week per semester.
Additional Learning Requirements	Projects, Group and individual assignments
NQF Credits	9
Prerequisite	Aquaculture (F3632OQ)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Reproductive Biology of Aquaculture important species in controlled environment; Reproductive Cycle: Gametogenesis (Oogenesis and spermatogenesis). Broodstock conditioning and management: Selection; Stocking densities; Feeding. Propagation: Environmental and Artificial spawning induction. Hatchery management: Technology; system designs; Water quality; Larval Rearing (first feeding, weaning, environmental conditions); Selective breeding and Production optimization; Automation of Aquaculture Production; Aquaculture Farm Production planning (production estimation, control and costing).

Student Assessment Strategies

Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade (i.e., at least 8 assessed practical (40%], 1 Project (20%), 3 tests [20%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 50% (1x 2 hours theory paper). Pass mark for the module is 50%.

F3621OR	PHYSICAL OCEANOGRAPHY
Module Title:	PHYSICAL OCEANOGRAPHY
Module Code	F3621OR
NQF Level	6
Notional Hours	80
Contact Hours	Lectures: 2 x 1hour/week per semester; Practical: 1 x 3hr alternate week per semester.
Additional Learning Requirements	Projects, Group and individual assignments
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Introduction to Oceanography: Oceanography; Definitions and concepts; History of oceanography. Planet Oceanus: the earth's structure; Physiography of the ocean floor; Geologic difference between continents and ocean basins; Ecological niche; Physical limiting factors; and limitation by biotic interactions (competition and predation). Origin of Ocean Basins: Continental drift; Sea floor spreading; global plate tectonics. Marine Sedimentation: Sediments in the sea – classification and controlling factors; shelf and deep-sea sedimentation; Properties of Seawater: Basic chemical and physical notions; water molecule, salinity; physical and chemical structure of the oceans; gases in seawater; the ocean as a chemical physical system; Wind and Ocean Circulation: atmospheric process; ocean surface currents; deep ocean circulation. Waves: Properties of ocean waves; Wave motions; Standing waves; and other types of progressive waves. Tides: Tidal characteristics; origin of tides; tidal currents.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 40% of the Module grade (i.e., practical, 2 tests and 2 assignments, and seminar presentation) and a summative assessment (end of semester examination) 60% (1x 2 hours theory paper). Pass mark for the module is 50%.

F3520ZP	BASIC PROGRAMMING WITH PYTHON
Module Title:	BASIC PROGRAMMING WITH PYTHON
Module Code	F3520ZP
NQF Level	5
Notional Hours	40
Contact hours	One practical session every week for the duration of CS1
Additional learning requirements	None
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
Python installation; Anaconda. Data Structures and their operations; Variables; Strings; numeric variables; Lists. Control Flow; if, else and elif statements. Functions; How to use basic functions; Numpy Arrays. Pandas; Series; DataFrames. Interaction with OS; Reading and Writing files. Data Visualization; histograms; line and scatter plots.

Student Assessment Strategies
Student assessment will be based on formative assessment only through 100% continuous assessment. The assessment comprises 1 programming assignment. A minimum mark of 50% is required pass the module.

F3610ZR	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Title:	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Code	F3610ZR
NQF Level	6
Notional Hours	80
Contact hours	4 lecture periods per week and one 3hour practical per week for core semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Core semester

Module Content
Learn how to navigate RStudio: how to load/save a file; load a package; access help. Examine the base R objects: vectors; matrices, arrays, lists, factors and tables; their respective characteristics, naming conventions and structures. Understand sub-setting, filtering and creation of these objects. Examine the implementation of control structures (loops and functions) in R. Investigate how R can be used for mathematical and statistical calculations. Data Cleaning and Manipulation in R: Lear how to manipulate and clean data in R; importing and exporting data from other statistical packages and data bases; aggregating data; reshaping data Visualisation (Packages): Learn how basic plots are generated in R – histograms; X-Y plots, bar charts; pie charts, scatter plot. Understand the ggplot2 package for advanced plotting. Statistical Testing: Understand how R can be used for hypothesis testing. Investigate how R can be used in statistical modelling techniques (SLR)

Student Assessment Strategies
Continuous Assessment: 100 % (minimum of 2 tests (30%), 1 project assignment (presented in oral and written form, 40%), 3 marked practicals, 30%). The pass mark for the module is 50%

E.2.2.2 BACHELOR OF SCIENCE IN FISHERIES AND OCEAN SCIENCE HONOURS (LEVEL 8)

ADMISSION REQUIREMENTS

Admission to the Bachelor of Science in Fisheries and Ocean Science Honours, requires a Bachelor of Science degree in fisheries, marine sciences, or related fields at NQF Level 7.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4800OG	Research Proposal	8	14	2L	None	C
F4880QK	Fishery and Oceanic Design Thinking	8	8	2L	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4883ON	Research Project (Semester 1 and 2)	8	16	None	None	C
F4811OO	Ocean Governance and Sustainable Economics	8	18	F4811OO	Ocean Governance and Sustainable Economics	8
F4801OM	Environmental Impact Assessment	8	9	2L/2T	None	C
F4831OL	Fisheries Stock Assessment	8	20	4L/3P	None	C
TOTAL Semester I						**47**
Year 1: Semester 2						
F4812OA	Aquaculture Practice and Management	8	20	4L/3P	None	C
F4812OB	Applied Ecophysiology	8	20	4L/3P	None	C
F4842OC	Seafood safety and quality control	8	10	2L/2P	None	E
F4862OD	Climate Dynamics and Oceanic Ecosystems	8	10	2L/2P	None	E
F4862OE	Physical and Chemical Oceanography	8	10	2L/2P	None	E
Total Credits Semester 2						**50**
Total credits for YEAR 1						**135**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F4880QK	FISHERY AND OCEANIC DESIGN THINKING
Module Title:	Fishery and Oceanic Design Thinking
Module Code	F4880QK
NQF Level	8
Notional Hours	140
Contact hours	(2 lectures periods per week)
Additional learning requirements	
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The purpose of this module is to equip students with the skills and mindset to creatively address challenges in fisheries and oceanic environments. Through design thinking principles, students will learn to develop innovative, sustainable, and innovative solutions that contribute to the advancement of blue economy and marine conservation.

Module Content

Introduction to Fishery and Oceanic Challenges: Understanding the significance of fisheries and ocean conservation, Identifying key challenges in blue economy and marine ecosystem preservation; Design Thinking Fundamentals: Exploring the principles and stages of design thinking, Emphasizing human-centred problem-solving and innovation; Empathetic Exploration: Techniques for engaging with stakeholders, fishermen, and marine experts, Conducting interviews, observations, and empathy-building activities; Problem Framing and Ideation: Defining problem statements related to fisheries and oceanic challenges, Engaging in brainstorming, mind mapping, and ideation sessions; Prototyping and Visualization: Creating tangible prototypes of potential solutions, Utilizing sketches, digital tools, and models to visualize ideas; Testing and Iteration: Gathering feedback from stakeholders and users, Applying iterative cycles to refine prototypes based on feedback; Sustainability and Impact: Incorporating sustainable practices in solution design, Assessing the potential positive impacts on fisheries, ocean conservation and Blue Economy; Collaborative Team Projects: Forming interdisciplinary teams to address specific challenges, Applying design thinking methodologies to develop comprehensive solutions ; Implementation Strategies: Developing actionable plans for implementing solutions in real-world scenarios, Considering logistical, economic, and social factors ; Final Presentations and Reflection: Presenting developed solutions to peers and experts, Reflecting on the effectiveness of design thinking in addressing fisheries and oceanic challenges.

Student Assessment Strategies

Assessment in the Fishery and Oceanic Design Thinking module is exclusively formative, based on 100% continuous assessment. The assessment comprises two components: participation in design thinking processes (weighted at 50%) and the Final Solution Showcase (weighted at 50%). Attaining a minimum mark of 50% is required to successfully pass the module.

F4800OG	RESEARCH PROPOSAL
Module Title:	Research Proposal
Module Code	F4800OG
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The purpose of this module is to equip students with the essential skills and knowledge required to develop a comprehensive and well-structured research proposal.

Module Content

Introduction to Research Proposals: Importance of research proposals in academic and professional contexts, Elements of a research proposal and their purposes; Identifying Research Problems and Objectives: Identifying gaps in current literature, Defining the scope of the research, Formulating clear research objectives and questions; Research Design and Methodology: Qualitative and quantitative research methods, Sampling techniques and sample size determination, Data collection methods (surveys, interviews, experiments, etc.), Data analysis techniques (qualitative coding, statistical analysis); Literature Review: Conducting a comprehensive literature review, Synthesizing previous research to justify the current study, Identifying gaps and research opportunities in the literature; Research Proposal Structure: Title, abstract, introduction, problem statement. Theoretical framework and research hypotheses, Research methodology and data analysis plan, Significance and contributions of the research, Proposed timeline and budget (if applicable); Writing and Presentation Skills:

Effective writing strategies for research proposals, Proper citation and referencing, Creating visually appealing proposal documents, Tips for presenting the research proposal to different audiences; Review and Feedback: Peer review and feedback on draft proposals, Revising and refining the proposal based on feedback.

Student Assessment Strategies

The Research proposal Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of the Draft Project Proposal (50%) and Research Proposal Presentation (50 %). A minimum mark of 50% needs to be achieved to pass the module.

Semester 1:

F4883ON	RESEARCH PROJECT
Module Title:	Research Project
Module Code	F4883ON
NQF Level	8
Notional Hours	160
Contact hours	N/A
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course is designed to give the students an opportunity to perform a research project under supervision according to an individual study plan and to summarize the results in a research report and present the results of the project

Module Content

Refining Research Design: Review and refine the research proposal, ensuring alignment with objectives and methodologies and confirming the feasibility of data collection methods and ethical considerations; Data Collection Planning: Develop a detailed plan for data collection, specifying timelines, locations, participants, and necessary resources, Ensure data collection tools are well-prepared and validated; Ethical Clearance and Permissions: Obtain any required ethical approvals for conducting the research, considering participant consent and privacy; Data Gathering: Implement the data collection plan, ensuring adherence to protocols and maintaining data quality; Data Analysis: Analyze the collected data as per the proposed analytical techniques, using appropriate software, Interpret results based on research questions and hypotheses; Findings Interpretation:- Interpret the research findings within the context of the proposed study and existing literature; Discussion and Implications: Engage in a critical discussion of findings, addressing their significance and potential implications; Reporting and Presentation: Prepare a comprehensive research report that reflects the original proposal's structure, Craft a clear and concise presentation of the research process and findings; Dissemination: Share the research outcomes through presentations, publications, or other relevant avenues

Student Assessment Strategies

The Research Project Assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Draft Project Proposal (25%)
- Draft research report presentation (20%)
- Final marked report (50%)
- Final corrected report (5%)

A minimum mark of 50% needs to be achieved to pass the module.

F4801OM	ENVIRONMENTAL IMPACT ASSESSMENTS
Module Title:	Environmental Impact Assessments
Module Code	F4801OM
NQF Level	8
Notional Hours	90
Contact hours	2 x 1hr/week lecturers per semester. Tutorial: 1 x 2 hr. Alternate week per semester
Additional learning requirements	Attendance of workshops and field trips/excursions related to environmental impact assessment processes
NQF Credits	9
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide students with a comprehensive understanding of the principles, methodologies, and applications of Environmental Impact Assessments (EIA) in marine and freshwater environments.

Module Content

Introduction to EIA: Historical evolution of EIA, Role of EIA in sustainable development, Comparative analysis of EIA practices in different countries ; Legal and Regulatory Framework: Global conventions influencing EIA (e.g., Rio Declaration, Agenda 21), National EIA regulations, guidelines, and standards, Compliance, enforcement, and legal implications of EIA; Steps in the EIA Process: Project Screening, Scoping, Baseline Study, Impact Prediction and Evaluation, Mitigation and Management, Reporting, Reviewing, Decision Making, Monitoring and Auditing; Baseline Data Collection: Remote Sensing, Geographic Information Systems (GIS) , Field Surveys, Water Quality Assessments); Impact Prediction: Qualitative Analyses, Quantitative Analyses, Risk Assessment; Mitigation Techniques: Avoidance, Minimization, Restoration, Compensation/Offset; EIA Documentation: Structure of a comprehensive EIA report, Essential components and appendices, Effective presentation and communication of findings; Public Participation in EIA: Importance of community and stakeholder engagement, Methods for public consultations: Workshops, surveys, focus groups, Addressing conflicts and controversies; Case Studies: EIA for Aquaculture Projects, Coastal Development EIAs, Deep-sea Mining EIA.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes

- 2 tests (50%),
- At least 2 written assignments (Field trips/workshop/project/excursion reports) (50%)

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F4831OL	FISHERIES STOCK ASSESSMENT
Module Title:	Fisheries Stock Assessment
Module Code	F4831OL
NQF Level	8
Notional Hours	200
Contact hours	4 x 1hr/week lecturers per semester.PracticalsI: 1 x 3 hr/week.
Additional learning requirements	Practical Workshops (Hands-on exercises using data analysis software, modelling tools, and scenario analyses)
NQF Credits	20
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide understanding of fundamental concepts, techniques, and methods employed in stock assessment of harvested aquatic populations; and the tools to evaluate the abundance, distribution, vital rates, and status of fish stocks.

Module Content

Introduction to Fisheries Stock Assessment: Role and importance in fisheries management; Fish Population Biology: Life histories, growth, reproduction, and mortality; Data Types and Sources: Distinction between fishery-dependent and fishery-independent data; Catch-per-Unit-Effort (CPUE) Analyses: Introduction to one of the core techniques in stock assessment; Fisheries-independent Survey Techniques: Trawl surveys, acoustic methods, tagging studies, and other observational techniques; Stock Assessment Models: Use of deterministic and stochastic models, e.g. surplus production models, yield-per-recruit models; Management Objectives and Reference Points: Using stock assessment results to inform management target and limit reference points; Case Studies: Examination of real-world fisheries stock assessments, their outcomes, and management implications.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes

- at least 4 assessed practicals (40%),
- 3 tests (40%),
- 1 written assignment (10%) and
- 1 seminar presentation (10%).

Semester 2:

F4812OA	AQUACULTURE PRACTICE AND MANAGEMENT
Module Title:	Aquaculture Practice and Management

Module Code	F4812OA
NQF Level	8
Notional Hours	200
Contact hours	4 x 1hr/week lecturers per semester. Practicalsl: 1 x 3 hr/week. Alternate week per semester
Additional learning requirements	Compulsory field trips/Excursions include visits to commercial aquaculture farms, hatcheries, fish processing facilities, and research institutions to provide hands-on experience and practical insights into industry operations
NQF Credits	20
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to introduce students to applied aquaculture farming techniques, practices, and overall management of the sector. The course further provides the student with underlaying principles of operating aquaculture as a business venture and regulation for the development and operation of aquaculture.

Module Content

Principles of aquaculture, trends, and prospects: Definition of aquaculture, global, regional and country production statistics, future forecasts; Aquaculture site and species selection: Site selection criteria, Factors affecting the selection of a species for aquaculture, Criteria for species selection; Aquaculture systems and production methods: Water sources for aquaculture, Different aquaculture production environments (fresh-, brackish-, and marine water environments), Intensity of production (extensive, semi-intensive and intensive production), criteria definitions, Aquaculture systems (ponds, cages, raceways, RAS, integrated agriculture-aquaculture); Aquaculture animal diseases: Infectious diseases (viruses, bacteria, fungi (mycosis), parasites); Non-infectious diseases (caused by genetic, nutritional, neoplastic factors), disease of unknown aetiology; Aquatic animal health and biosecurity: internal and external barriers, aquaculture animal biosecurity risk assessment; Production model (Excel exercise in water, feed requirement, fish growth and mortality): Determination of production targets, broodstock and fingerlings requirements, Growth and mortality modelling, Estimation of feed based on biomass, feeding ratio and feed conversion ratios, Decision-making process on the feed choice based on factors such as FCR and cost; Production cost: Input cost of production, Investment cost, Variable and Fixed production cost, Development of farm financial statement (Income statement, Balance sheet; Profitability assessment: Evaluation of farm production (gross yield, survival, growth rate), input efficiency (FCR, production per area/volume and labour, cost of production, stock turnover ratio), Profitability indicators (Net Present Value, Internal Rate of Return, Pay-back period), Solvency and Liquidity measures (net capital ratio, debt/asset ratio, debt/equity ratio, debt structure ratio; current ratio, acid test ratio and working capital), Economic principles, markets, value chain of aquaculture: Aquaculture as a business, strategic management and decision making, value chain and value addition in aquaculture; Project financing, calculation of loans and depreciation : Financing of aquaculture, finance application process, interest rates, loan repayment, calculation of asset depreciation (importance); Aquaculture Regulations, Licensing and Permits.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade which includes,

- at least 4 assessed practicals (40%),
- 3 tests (40%),
- 1 written assignment (10%), and
- a seminar presentation (10%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F4812OB	APPLIED ECOPHYSIOLOGY
Module Title:	Applied Ecophysiology
Module Code	F4812OB
NQF Level	8
Notional Hours	200
Contact hours	4 x 1hr/week lecturers per semester. Practicalsl: 1 x 3 hr/week. Alternate week per semester
Additional learning requirements	Field-based practicals/excursions [Ecological surveys in various aquatic and terrestrial environments, physiological assessments of organisms in their natural habitats, and hands-on data collection and analysis]
NQF Credits	20
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide a comprehensive understanding of the physiological adaptations and responses of aquatic organisms, with a special focus on fish (ichthyology). The module explores the relationships between fish and their environment, integrating principles of ecophysiology and ichthyology.

Module Content

Introduction to Aquatic Ecophysiology and Ichthyology: Overview, importance, and fundamental concepts; Environmental Factors in Aquatic Ecosystems: Examining the effects of light, temperature, oxygen, salinity, pressure, and other factors on fish physiology; Fish Physiology and Adaptations: Understanding how fish respond to environmental changes and stressors; Fish Health Assessment: Application of physiological measurements to assess fish health and predict responses to environmental changes; Techniques in Aquatic Ecophysiology and Ichthyology: Laboratory and field methods for studying fish physiology and ecology; Conservation and Management of Aquatic Organisms: Overview of the threats facing aquatic organisms and their habitats, including climate change, habitat degradation, overfishing, and invasive species.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes:

- at least 4 assessed practicals (40%),
- 3 tests (40%),
- 2 written assignments (20%),

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F4842OC	SEAFOOD SAFETY AND QUALITY CONTROL
Module Title:	Seafood Safety and Quality Control
Module Code	F4842OC
NQF Level	8
Notional Hours	100
Contact hours	2 x 1hr/week lecturers per semester. Practicalsl: 1 x 2 hr/week. Alternate week per semester
Additional learning requirements	Projects, Group, and individual assignments
NQF Credits	10
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose

This course familiarises students to fish food safety and quality control. The course will also help students in distinguishing various techniques of quality assessment and assurance, as well as having a thorough understanding of microflora degrading fishing products. Finally, students will learn how to produce quality fish products that will meet local demand while also generating foreign currency.

Module Content

Introduction: Food safety in fisheries products (finfish and shellfish), the goal, scope, and significance of food safety programmes Quality management, total quality concept and application in fish trade, food safety issues, and fishery product quality assurance. Researchable issues in this industry. Quality assurance: hygiene and safety aspects of quality control, the standard sanitary operating system (SSOP) and the standard operating system (SOP) in the processing plant, the Good Manufacturing Procedure (GMP), and the inspection of fish and fishery products. HACCP, information for quality management. Quality assessment: Physical, chemical, organoleptic, and microbiological quality criteria for fish and fisheries products. Food hazards: physical, chemical, and biological risks. Traceability for Food Safety: background, significance, approach, implementation, and steps. Food legislations and standards, competent authority: quality control and official inspection system, regulatory standards for products and processing plants.

Student Assessment Strategies

Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade which includes:

- at least 2 assessed practical (40%)
- 2 tests (40%), and
- 2 assignments, assessed as written/presentations (20%)

The summative assessment (end-of-semester examination) will contribute 60% (1x 3 hours theory paper) to the final grade. The pass mark for the module is 50%.

F4862OD	CLIMATE DYNAMICS AND MARINE ECOSYSTEMS
Module Title:	Climate Dynamics and Marine Ecosystems
Module Code	F4862OD
NQF Level	8
Notional Hours	100
Contact hours	2 x 1hr/week lecturers per semester. Practicalsl: 1 x 2 hr/week. Alternate week per semester
Additional learning requirements	Workshop/ field trips/excursions/cruises [Oceanographic research cruises to study marine ecosystems, coastal field trips to assess climate impacts on marine habitats,

	hands-on workshops on climate modeling and data analysis, excursions to research institutions and marine protected areas]
NQF Credits	10
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with a comprehensive understanding of the impacts of climate change on marine ecosystems. The module will explore the physical and chemical changes and as a result biological changes in the ocean due to climate change, and how these changes affect marine biodiversity, ecosystem function, and the services they provide.

Module Content

Introduction to Climate Change: The Greenhouse Effect, Human Contributions to Climate Change, Climate Change Projections; Physical and Chemical Changes in the Ocean: Sea-level Rise, Ocean Warming, Ocean Acidification, Changes in Ocean Circulation; Impacts on Marine Ecosystems; Changes in Species Distribution, Impacts on Marine Biodiversity, Changes in Ecosystem Functions and Services; Impacts on Fisheries and Aquaculture: Changes in Fish Stocks and Productivity, Implications for Food Security and Livelihoods; Adaptation Strategies: Ecosystem and nature-based adaptation, Marine Protected Areas, Sustainable Fisheries Management, Coastal Zone Management; Mitigation Strategies: Reducing Greenhouse Gas Emissions, Blue Carbon and Carbon Sequestration, Renewable Energy; Policy and Governance in Climate Change: International Agreements and Conventions (e.g., Paris Agreement), National Climate Change Policies; Climate Change Communication and Advocacy: Science Communication Techniques, Stakeholder Engagement, Advocacy and Campaign Strategies; Application of AI in climate modelling: AI and climate science, predictive analytics, data interpretation, and policy implications.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade,

- at least 2 assessed practicals (40%),
- 2 tests (40%),
- 1 written assignment (10%), and
- a seminar presentation (10%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F4862OE	PHYSICAL AND CHEMICAL OCEANOGRAPHY
Module Title:	Physical and Chemical Oceanography
Module Code	F4862OE
NQF Level	8
Notional Hours	100
Contact hours	2 x 1hr/week lecturers per semester. Practicalsl: 1 x 2 hr/week. Alternate week per semester
Additional learning requirements	Oceanographical cruises / excursions
NQF Credits	10
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with a comprehensive understanding of the oceans, their processes, and interactions with the atmosphere and land

Module Content

Introduction to Oceanography: Definition and branches of oceanography, History of ocean exploration and research; Physical Oceanography: Physical properties of seawater, Ocean currents, waves, and tides, Ocean circulation and the thermohaline conveyor; Chemical Oceanography: Chemical composition of seawater, Nutrient cycles and chemical exchanges, Ocean acidification and carbon sequestration; Geological Oceanography: Ocean basins and continental margins, Plate tectonics and seafloor spreading, Marine sediments and palaeoceanography; Ocean-Atmosphere Interactions: Heat exchange and ocean-atmosphere coupling, El Niño and La Niña phenomena, Oceans and climate change. Application of AI in oceanographical research: Data Collection, Data Preprocessing, Model Training, Real-time Prediction, and Adaptive Learning.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes

- at least 2 assessed practicals (40%),
- 2 tests (40%) and
- 2 written assignments (20%)

The summative assessment (end-of-semester examination) will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

E.2.3 DEPARTMENT OF FOOD SCIENCE AND SYSTEMS

E.2.3.1 BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY (HONOURS) 31BSFT

ADMISSION REQUIREMENTS

To be admitted into the **Bachelor of Science in Food Science and Technology Honours**, a candidate should have obtained the following grades at National Senior Secondary Certificate Advanced Subsidiary Level (NSSCAS)/ National Senior Secondary Certificate Ordinaly (NSSCO) level, or equivalent from a recognized qualification:

1. Subject to School Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Science in Food Science and Technology Honours** programmes shall be:

(i) A pass in five different subjects as follows:
(a) 2 subjects on NSSCAS level and obtained a "d" or higher, including Biology and one of Mathematics, Physics/Chemistry
(b) 3 subjects on NSSCO level with a C or higher, and should include at least one of Mathematics, and Physics/Chemistry.
(c) English must be at minimum C grade on NSSCO level

Or

(ii) A pass in five different subjects as follows:
(a) 3 subjects on NSSCAS level with a "d" including Biology and one of Mathematics, Physics/Chemistry.
(b) 2 subjects on NSSCO level with a D or higher, and should include at least one of Mathematics, and Physics/Chemistry.
(c) English must be at minimum C grade on NSSCO level

(2) For applicants with school leaving certificates obtained prior to 2021, the requirements of the UNAM admission, students recruitment and registration policy will apply: Subject to School Special Regulations, the normal basic requirement for entrance to bachelor of Science in Food Science and Technology Honours programme shall be:

(iii) A pass in five different subjects as follows:
(a) 2 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 3 subjects on ordinary level (NSSCO) with a C or higher in Mathematics and Biology, and at least a "D" symbol in either Physical Science, Chemistry or Physics
(c) English must be at minimum C at NSSCO level

Or

(iv) A pass in five different subjects as follows:
(a) 3 subjects on higher level (NSSCH) with a 4 or higher including Mathematics and Biology
(b) 2 subjects on ordinary level (NSSCO) with a D or higher symbol in either Physical Science, Biology, Chemistry or Physics.
(c) English must be at minimum C at NSSCO level.

(iv) Extended enrolment:
(a) Candidates that qualify for admission to the University but lack the appropriate subjects on NSSCAS (or grades), as outlined above, for admission to the programme can opt to rather enrol for the Extended mode of this programme that will take one year longer.
(b) Candidates in possession of a valid Namibian Senior Secondary Certificate (NSSC) issued prior to 2021 (only) and has a pass in 5 different subjects, as outlined below, can enrol in the Extended mode of this programme:

PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisites)/ Pre-requisites	Contact hours per week (L/P/T)
Year 1 Core Semester						
U3583AL	Academic Literacy I	5	8	C	None	40 hours
U3403FS	Skills Portfolio	4	0	C	None	
U3583DD	Digital Literacy	4	8	C	None	Sem 0: 4hr/wk Sem 1: 2hr/wk Sem 2: 2hr/wk
F3500ZI	Issues in Agriculture	4	4	E	None	20 hr
F3520ZP	Basic Programming with Python	5	4	E	None	20 hr
Total Credits Core Semester			24			
Year 1 Semester 1						
S3531CG	Introductory Physical and Inorganic Chemistry	5	14	C	None	L (4hr/wk), P (1hr/wk)
F3531CA	Mathematics for Agriculuture	5	12	C	None	L (4hr/wk), T (2hr/wk)

S3511PG	General Physics I	5	14	C	None	L (4hr/wk), P/T (1hr/wk)
S3511BB	Foundations of Biochemistry and Biology	5	14	C	None	L(4hr/wk, P(1hr/week)
Total Credits Semester 1			54			
Year 1 Semester 2						
S3532CG	Introductory Analytical and Organic Chemistry	5	14	C	None	L (4hr/wk), P (1hr/wk)
S3512ST	Statistical Methods	5	12	C	None	L (4hr/wk), T (1hr/wk)
F3512SH	Human Nutrition	5	13	C	None	L (4hr/wk), P (3hr/alt. wk)
F3512SP	Food Processing and Technology	5	13	C	None	L (4hr/wk), P (1hr/alt. wk)
Total Credits Semester 2			52			
Total credits Year 1			130			

Year 2 Core Semester						
U3683AL	Academic Literacy II	6	8	C	None	L(4hr/wk)
U3520LP	Leadership Skills	5	2	C	None	L(2hr/wk)
U3420CN	National and Global Citizenship	4	2	C	None	L(2hr/wk)
U3420PJ	Project Management Skills	5	2	C	None	L(2hr/wk)
F3610ZR	Introduction to Statistical Programming with R	6	8	C	None	L(4hr/wk)
U3420SE	Sustainability and Environmental Awareness	4	2	C	None	L(2hr/wk)
Total Credits Core Semester			24			
Year 2 Semester 1						
F3611SG	General Microbiology	6	15	C	None	L (4hr/wk), P (3hr/alt. wk)
F3611AB	Biochemistry	6	16	C	S3511BB: Foundation of Biology and Biochemistry	L (4hr/wk), P (3hr/ wk)
F3601SP	Postharvest Technology	6	7	C	None	L (2hr/wk), P (3hr/alt. wk)
F3611SM	Meat Science and Technology	6	15	C	None	L (4hr/wk), P (3hr/alt. wk
Total Credits Semester 1			54			
Year 2 Semester 2						
F3612SD	Dairy Science and Technology	6	15	C	F3512SP: Food Processing and Technology	L (4hr/wk), P (3hr/alt. wk
F3612SS	Sea Foods Technology	6	15	C	None	L (4hr/wk), P (3hr/alt. wk)
F3612SE	Food Engineering 1	6	15	C	S3511MS: Mathematics Support I	L (4hr/wk), P/T (2hr/alt. wk)
F3602SW	Workplace Attachment Preparation	6	8	C	None	L (2hr/wk)
Total Credits Semester 2			53			
Year 2 Total Credits			130			
Year 3 Core Semester						
W3710SW	Workplace Attachment	7	24	C	None	8 weeks
Total Credits Core Semester			24			
Year 3 Semester 1						
F3711SF	Fruits and Vegetable Technology	7	17	C	F3601SP: Postharvest Technology	L (4hr/wk), P (3hr/alt. wk)
F3701SM	Food Microbiology	7	8	C	F3611SG: General Microbiology	L (2hr/wk), P (3hr/alt. wk)

F3711SC	Food Chemistry	7	17	C	F3611AB: Biochemistry	L (4hr/wk), P (3hr/alt. wk
F3701SE	Food Engineering II	7	9	C	F3612SE: Food Engineering I	L (2hr/wk), P/T (2hr/ wk)
Total Credits Semester 1			50			
Year 3 Semester 2						
F3712CB	Biometry	7	16	C	S3512ST: Statistical Methods	L(4hr/wk), T (2hr/wk)
F3702SP	Product Development	7	9	C	F3512SP: Food Processing and Technology	L(2hr/wk), P (2hr/wk)
F3712SS	Food and Sensory Analysis	7	17	C	F3711SC: Food Chemistry	L(4hr/wk), P (3hr/alt. wk)
F3702SB	Food Biotechnology	7	8	C	None	L (2hr/wk), P (3hr/alt. wk)
Total Credits Semester 2			51			
Year 3 total credits			125			
Year 4 Core Semester (22 credits)						
F3820SD	Design thinking	8	8	C	None	L(2hr/wk)
F3810SR	Research proposal	8	14	C	None	L(4hr/wk)
Total Credits Core Semester			22			
Year 4 Semester 1						
F3811SE	Food Entrepreneurship and Management	8	18	C	None	L (4hr/wk), T (2hr/alt. wk)
F3801SQ	Quality Management Systems	8	9	C	None	L (2hr/wk), P (2hr/alt. wk)
F3883SR	Research Project	8	8	C	F3810SR: ResearchProposal; F3712CB: Biometry	L(2hr/wk)
F3811SG	Grains and Cereals Processing	8	19	C	F3601SP: Postharvest technology; F3711SC: Food Chemistry	L (4hr/wk), P (3hr/alt. wk)
Total Credits Semester 1			54			
Year 4Semester 2						
F3802SB	Beverage Science and Technology	8	9	C	None	L (2hr/wk), P (3hr/alt. wk)
F3883SR	Research Project	8	8	C	F3810SR: Research Proposal; F3712CB: Biometry	L(2hr/wk)
F3812ST	Food Toxicology	8	19	C	Noe	L (4hr/wk), P (3hr/alt. wk)
F3812SO	Oilseeds Processing Systems	8	19	C	F3711SC: Food Chemistry; F3512SP: Food Processing and Technology	L (4hr/wk), P (3hr/alt. wk)
Total Credits Semester 2			55			
Year 4 total credits			131			
TOTAL CREDITS FOR THE PROGRAMME			516			

Extended Enrolment

NSSCAS Biology, Physics/Chemistry & NSSCO Mathematics
This option caters for students that has the required NSSCAS Biology and NSSCAS Physics/Chemistry, but not Mathematics
Physics/Chemistry, but not Mathematics

Year	Core Semester	Level	Cr	Semester 1	Level	Cr	Semester 2	Level	Cr
Y1	Skills portfolio	5	0	Introductory Physical & Inorganic Chemistry	5	14	Introductory Analytical & Organic Chemistry	5	14
	Academic literacy I	5	8	Mathematics Support I	4	NCB	Mathematics Support II	4	NCB
	Digital literacy	5	8	General Physics I	5	14	Human Nutrition	5	13
	Introduction to Statistical	5	4	Foundations of Biochemistry & Biology	5	14	Food Processing & Technology	5	13

	Programming with python								
	Issues in Agriculture	5	4						
			24			42			40
Y2	Academic Literacy II	6	8	General Microbiology	6	15	Dairy Science & Technology	6	15
	Introduction to programming with R School Specific (Elective)	6	8	Biochemistry	6	16	Seafood Technology	6	15
	Leadership	6	2	Postharvest Technology	6	7	Statistical Methods	5	12
	National and global citizenship	6	2	Calculus I	5	12	Workplace Attachment preparation	6	8
	Project management	6	2						
	Sustainability and Environmental Awareness	6	2						
			24			38			50
Y3	Workplace Attachment 8 weeks Mid-January to Middle March	7	24	Food Microbiology	7	8	Biometry	7	16
				Food Chemistry	7	17	Food & Sensory Analysis	7	17
				Food Biotechnology	7	8	Food Engineering 1	7	15
				Meat Science and Technology	6	15	Beverage Science & Technology	8	9
			24			48			57
Y4	Design Thinking	8	8	Quality Management Systems	8	9	Grains & Cereals Processing	8	19
				Food Toxicology	8	19	Food Engineering II	7	9
				Fruits and Vegetable Technology	7	17	Product development	7	9
			8			45			37
Y 5	Research Proposal	8	14	Food Entrepreneurship and Management	8	18	Oilseeds Processing Systems	8	19
				Research Project	8	8	Research Project	8	8
			14			26			27
									Total: 516

NSSCAS Mathematics, Physics/Chemistry & NSSCO Biology

This option caters for students that has the required NSSCAS Mathematics and NSSCAS Physics/Chemistry, but not Biology

Year	Core Semester	Level	Cr	Semester 1	Level	Cr	Semester 2		Level	Cr
EY1	Skills portfolio	5	0	Introductory Physical &	5	14	Introductory Analytical and		5	14

				Inorganic Chemistry			Organic Chemistry			
	Academic literacy I	5	8	Calculus I	5	12	Statistical Methods		5	12
	Digital literacy	5	8	General Physics I	5	14	Human Nutrition		5	13
	Introduction to Statistical Programming with python	5	4	Biology Support	4	NCB	Food Processing & Technology		5	13
	Issues in Agriculture	5	4							
			24			40				52
EY2	Academic Literacy II	6	8	General Microbiology	6	15	Dairy Science & Technology		6	15
	Introduction to programming with R School Specific (Elective)	6	8	Postharvest Technology	6	7	Seafood Technology		6	15
	Leadership	6	2	Meat Science and Technology	6	15	Food Engineering 1		6	15
	National and global citizenship	6	2	Foundations of Biochemistry and Biology	5	14	Workplace Attachment preparation		6	8
	Project management	6	2							
	Sustainability and Environmental Awareness	6	2							
			24			51				53
EY3	Workplace Attachment 8 weeks Mid-January to Middle March	7	24	Fruits and Vegetable Technology	7	17	Biometry		7	16
				Food Microbiology	7	8	Product development		7	9
				Food Biotechnology	7	8	Food Engineering II		7	9
				Biochemistry	6	16				
			24			49				34
EY4	Design Thinking	8	8	Quality Management Systems	8	9	Beverage Science & Technology		8	9
				Food Toxicology	8	19	Grains & Cereals Processing		8	19
				Food Chemistry	7	17	Food & Sensory Analysis		7	17
			8			45				45
EY5	Research Proposal	8	14	Food Entrepreneurship and Management	8	18	Oilseeds Processing Systems		8	19
				Research Project	8	8	Research Project		8	8
			14			26				27
										Total: 516

MODULE DESCRIPTORS

FIRST YEAR EXTENDED

S3411TM	BIOLOGY SUPPORT
Module Title:	BIOLOGY SUPPORT
Module Code	S3411TM
NQF Level	4
Notional Hours	140
Additional learning requirements	None
Contact Hours	4 lectures and one 3-hour practical session per week for the semester
NQF Credits	14/NCB
(Co-requisites)	
Prerequisite	None
Compulsory/ Elective	Compulsory
Semester Offered	1

Module Content
This is an introductory biology module that is designed to allow students to acquire a strong foundation into the biological sciences.
The following topics will be covered:
The 5 common themes of life (biological organization, genetic information, energy and matter, interactions with organisms and their physical environment and evolutionary adaptation). Introduction to systems of classification (systematics, including hierarchical, artificial, phenetic and phylogenetic classification); Basic techniques in biology such as microscopy: biological drawing, the scientific method and writing of scientific reports will be covered; Chemical basis of life: water, carbon, carbohydrates, proteins, nucleic acids, lipids and fats ; Cell biology: prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton. Membrane structure and function, Cellular communication: Signalling molecules, signal reception, transduction and response. Mitosis and meiosis: cell cycle and stages of each process. Mendelian genetics: Genes, chromosomes, genomes, introduction to Mendelian genetics, chromosome theory of inheritance.

Student Assessment Strategies
Formative Assessment:
Formative assessment will make up 50% of the module grade (Tests, Assignments, Quizzes and Practical reports)
Summative Assessment:
Examination: 1 x 3h examination at the end of the semester that counts 50% towards the final mark
Final Mark: 50% CA mark and 50% Examination mark
A subminimum of 40% in the examination is required to pass, irrespective of the final mark
To pass this Module the student must obtain a minimum final mark of 50%

S3411MS	MATHEMATICS SUPPORT I
Module Title:	MATHEMATICS SUPPORT I
Module Code	S3411MS
NQF level	4
Notional Hours	120
Contact Hours	4 lecture hours + 1 tutorial session per week for one semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered:	1

Module Content:
Sets and their combinations: Sets, equality of sets, revision of intersection, union, relative complement, de Morgan's laws and other laws of algebra of sets, proving simple tautologies, the power set, cardinality, inclusion-exclusion formula, number fields, Cartesian products, ordered pairs and relations.
Intervals on the real number line: Introduction, combinations, types of inequalities – linear,
absolute value, quadratic; identification of the respective solution sets in interval form.
Matrix calculus: Definition, matrix operations, (square) matrix algebras and the laws – associativity, distributivity- that hold in them, invertible matrices.
Systems of linear equations: Linear systems and their (augmented) matrices, homogeneous and inhomogeneous systems, Gaussian row and column operations, echelon form, rank of a matrix, types of solution behaviour and how to recognise them, matrix inversion with the companion method.
The concept of function: Definition of a function, when is a relation a function?, domain and range of a real-valued function, injective, surjective, bijective functions, the inverse of a bijective function, odd or even real-functions, piecewise defined functions, introduction to function graphs, graph transformations, graphical correlates of function properties already discussed.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a minimum of 3 (three) main tests and
a minimum of 3 (three) tutorial tests.
A continuous assessment mark of at least 40% is required to obtain exam admission.

One examination with a minimum duration of 3 hours and worth 50% of the final mark. A subminimum of 40% in the examination is required to pass, regardless of the final mark.
A final mark of 50% is required to pass the course.

S3412MS	MATHEMATICS SUPPORT II
Module Title:	MATHEMATICS SUPPORT II
Module Code	S3412MS
NQF Level	4
Notional Hours	120
Contact Hours	4 lecture hours + 1 tutorial session per week for one semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered:	2

Module Content:
More theory of functions: Exponentials and logarithms, the exact definitions of limit and continuity,
end behaviour of a graph; differentiation, definition, product, quotient, chain rules, examples from the natural sciences.
Function graphs: The graphs of polynomial, rational, trigonometric, exponential, logarithmic functions.
Integration: Definition and basic properties of the Riemann integral, the Fundamental Theorem of calculus, integrals of simple function, integration by parts and substitution rule; applications to the comoutation of areas and (rotational) volumes.
Complex numbers: Definition and basic computations, polar coordinates, complex powers, complex roots, roots of unity, complex trigonometric, exponential, logarithmic functions, the complex plane.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a minimum of 3 (three) main tests and
minimum of 3 (three) tutorial tests.
A continuous assessment mark of at least 40% is required to obtain exam admission.
One examination with a minimum duration of 3 hours and worth 50% of the final mark. A subminimum of 40% in the examination is required to pass, regardless of the final mark.
A final mark of 50% is required to pass the course.

S3411PS	PHYSICS SUPPORT I
Module Title:	PHYSICS SUPPORT I
Module Code	S3411PS
NQF Level	4
Notional Hours	140
Contact Hours	Four (4) lectures and a 3-hour practical session every second week alternating with a 1-hour tutorial session every second week per week for one semester.
Additional learning requirements	None
NQF Credits	13/NCB
(Co-requisites)	
Pre-requisites	Entry requirements
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Measurement & estimation: units, unit conversions, uncertainties, significant figures; Mechanics: Kinematics in 1D & 2D, vectors, dynamics, Newton's laws, circular motion, Newtonian gravitation, work & energy, linear momentum, rotational motion, static equilibrium, fluids; Waves & Acoustics: oscillations, waves, sound; Thermodynamics: temperature, kinetic theory, heat, the laws of thermodynamics.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes, assignments, and practical reports (at least 5 gradable items).
A continuous assessment mark of at least 40% is required to gain exam admission.
One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
A final mark of 50% is required to pass this module.
To qualify for a Supplementary Exam a final mark of 45—49% is required, subject to a subminimum of 40% in the Exam.

S3412PS	PHYSICS SUPPORT II
Module Title:	PHYSICS SUPPORT II
Module Code	S3412PS
NQF Level	4
Notional Hours	140
Contact Hours	Four (4) lectures and a 3-hour practical session every second week alternating with a 1-hour tutorial session every second week per week for one semester.
Additional learning requirements	None
NQF Credits	13/NCB
(Co-requisites)	

Pre-requisites	Entry requirements
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Electricity & Magnetism: electric charge & electric field, electric potential, electric currents, DC circuits, magnetism, electromagnetic induction, Faraday's law; Electromagnetic waves & light: electromagnetic waves, light, geometric optics, wave nature of light, optical instruments; Radioactivity: radioactivity, elementary nuclear physics, effects & use of radiation.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes, assignments, and practical reports (at least 5 gradable items).
A continuous assessment mark of at least 40% is required to gain exam admission.
One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
A final mark of 50% is required to pass this module.
To qualify for a Supplementary Exam a final mark of 45—49% is required, subject to a subminimum of 40% in the Exam.

S3431CS CHEMISTRY SUPPORT I

Module Title:	CHEMISTRY SUPPORT I
Module Code	S3431CS
NQF Level	4
Notional Hours	140
Contact hours	4 lecture periods and 1 practical session per week
Additional learning requirements	
NQF Credits	NCB/14
(Co-requisites) Prerequisite	None
Compulsory/Elective	
Semester Offered	1

Module Content
Introduction: Matter, Measurement and Molecules; Stoichiometry: Calculations with Chemical Formulae and Equations; Aqueous Reactions and Solutions Stoichiometry; Electronic Structure of Atoms; Periodic Properties of the Elements and Relationships Among Elements; Basic Concepts of Chemical Bonding; Intermolecular Forces; Basic Molecular Geometry and Bonding Theories; Gases.

Student Assessment Strategies
Tests: A minimum of three tests which counts 70% towards the continuous assessment (CA) mark.
Laboratory Mark: Laboratory work is graded and the average counts 20 % towards the CA mark.
Tutorials: Each tutorial session is graded and counts 10% towards the CA mark.
Examination: There is a one 3hr examination at the end of the semester and counts 50% towards the final mark.
Final Mark: 50% CA mark and 50% Examination mark
To pass this course, the student must obtain a minimum final mark of 50%.

S3432CS CHEMISTRY SUPPORT II

Module Title:	CHEMISTRY SUPPORT II
Module Code	S3432CS
NQF Level	4
Notional Hours	140
Contact hours	4 lecture periods and 1 practical session per week
Additional learning requirements	
NQF Credits	NCB/14
Prerequisite	
(Co-requisites)	None
Compulsory/Elective	
Semester Offered	2

Module Content
Thermochemistry, Chemical Equilibrium, Entropy, Free Energy and Equilibrium, Chemical Kinetics, Acid-Base Equilibria, Additional Aspects of Aqueous Equilibria: The Common-Ion Effect, Buffer Solutions, Acid-Base Titrations, Electrochemistry, Introduction to Organic Chemistry

Student Assessment Strategies
Tests: A minimum of three tests which counts 70% towards the continuous assessment (CA) mark.
Laboratory Mark: Laboratory work is graded and the average counts 20 % towards the CA mark.
Tutorials: Each tutorial session is graded and counts 10% towards the CA mark.
Examination: There is a one 3hr examination at the end of the semester and counts 50% towards the final mark.
Final Mark: 50% CA mark and 50% Examination mark
To pass this course, the student must obtain a minimum final mark of 50%.

S3512ED DIVERSITY OF LIFE

Module Title:	DIVERSITY OF LIFE

Module Code	S3512ED
NQF Level	5
Notional Hours	140
Contact Hours	4 lecture periods and one 3-hour practical per week for one semester
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Phylogeny and the tree of life: Prokaryotes and Protists, Domains Bacteria: Archae and Eukarya, The Evolution of Plant and Fungal Diversity. Non-vascular and Vascular Plants: Non-vascular plant phyla: Hepatophyta, Anthocerophyta and Bryophyta. Vascular seedless plant phyla: Lyctophyta and Pterophyta. Vascular seed plant (gymnosperms and angiosperms). Gymnosperms phyla: Gingkophyta, Cycadophyta, Gnetophyta and Confirophyta. Angiosperm's phylum: Anthophyta. The Evolution of Invertebrate Diversity: Basal Animals, phylum: Cnidaria, Deuterostomate phyla: Echinodermata (Subphyla: Urochordata, Cephalochordata), protostomate phyla: Lophophorates, Rotifera, Mollusca, Anellida, Nematoda, and Anthropoda. The Evolution of Vertebrate Diversity: Vertebrate Evolution and Diversity key shared derived traits of the chordates and the chordate Subgroups. Animal Diversity: Characteristics of following vertebrate groups: hagfishes, lampreys, chondrichthyans, ray-finned fishes, lobe-finned fishes, amphibians, reptiles, birds, and mammals. Primate Diversity. Hominin Evolution.

Student Assessment Strategies
Student assessment for this Module will consist of formative and summative tasks. Formative assessments will make up 50% of the Module grade (i.e., at least 8 assessed practicals (40%], 3 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

PART B: MODULE DESCRIPTORS

U3583AL ACADEMIC LITERACY I

Module Title:	**ACADEMIC LITERACY I**
Module Code	U3583AL
NQF Level	5
Notional Hours	80
NQF Credits	8
Prerequisite	None
Contact Hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Compulsory/Elective	Compulsory
Semester Offered	0,1&2

Module Content
The module will cover study skills, reading, listening, speaking and writing, referencing, language usage and text organization.

Student assessment strategies
Assessment will be based on Continuous Assessment.

U3403FS SKILLS PORTFOLIO

Module Title:	**SKILLS PORTFOLIO**
Module Code	U3403FS
NQF Level	4
Notional Hours	N/A
Contact hours	N/A
Additional learning requirements	None
NQF Credits	0
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
UNIT 1: **Academic Planning and Goal Setting**
Individual Needs and Values; Steps in Reaching a Personal Vision; Proactive Approach Towards Learning; Self-Regulated Learning; Personal and Academic Goal Setting; Receptiveness to Learning; Exploring Self- Development and Self- Awareness.
UNIT 2: Attitude and Motivation
Understanding Motivation; Personal Attitudes, Behaviors and Interests; Self-Reflective Process; Approaches to Dealing with Negative Factors; Class Attendance and Participation; Procrastination; Self-Reliance; Discipline; Accountability; Healthy Habits.
UNIT 3: Learning styles
Understanding Personal Approaches to Learning; Dynamics of The Learning Process; Learning Styles and Strategies.
UNIT 4: Study Methods and Skills
Study Habits and Strategies; Learning Styles and Techniques; Effective Study Methods and Skills; Note Taking; Memory and Reading Skills; Critical Thinking.

UNIT 5: Time Management
Effective Time Management; Planning; Decision-making; Prioritization; Setting Boundaries; Time for Self – care; Procrastination.
UNIT 6: Assessment Preparation
In class exercise; Test and Examination preparation; Organizing academic workload; Setting daily study goals; Staying physically active; Study groups.
UNIT 7: Mental well-being
Understanding mental health; Signs and indicators of poor mental health; commonly experienced mental health challenges; psychosocial stressors; Seeking professional help; Coping strategies.
UNIT 8: Interpersonal Communication
Effective Communication Skills; Verbal and Non-Verbal Communication; Listening Skills; Problem Solving; Assertiveness; Negotiation Skills; Practicing Empathy in Communication; Self-Confidence; Receptiveness to Feedback; Building Trust; Teamwork; Leadership; Public Speaking Skills.
UNIT 9: Financial matters and management
Financial Literacy; Budgeting; Available Finance Options and Assistance; Managing Financial Resources.
UNIT 10: Student Violence
Types of Violence; Individual Roles in Violence; Myths, Forms; Consequences of Violence; Prevention Measures; Seeking for Help.
UNIT 11: Career Planning and Development
Defining and Selecting Career Goals; Career Exploring Different Strategies; Soft Skills Training.

Student Assessment Strategies
100% continuous assessment
Reflective journal on each unit (portfolio)

U3583DD DIGITAL LITERACY

Module Title:	**DIGITAL LITERACY**
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content
Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites
Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time
Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues
Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia
Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings
Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks
Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog)
Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Student Assessment Strategies
1. Collaborative assessment tasks
1.1 Digital productivity: cloud based collaborative digital media creation using cloud platforms
1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing
2. Individual assessment tasks
2.1 Assignment: information literacy assignment
2.2 Test x 2
3. Practical
3.1 Digital proficiency
3.2 Data and Media literacy
No written examination

F3500ZI ISSUES IN AGRICULTURE

Module Title:	**ISSUES IN AGRICULTURE**
Module Code	F3500ZI
NQF Level	5
Notional Hours	40
Contact hours	20 Contact hours
Additional learning requirements	Field trips, Seminars and guest lectures
NQF Credits	4
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module content
Agriculture: Agriculture as important economic sector; Population dependence on agriculture for their livelihoods. Production systems: Production systems and production sustainability. Land tenure systems: freehold and customary tenure. Agricultural Opportunities and Restrictions: such as the veterinary cordon fence; financial collateral; and the greed in the commons. The Namibian market driven economy and agricultural contribution: Agricultural practices; Resilience of livelihoods to withstand challenges posed by climate change; land scarcity, water; drought management relation to climate change; Cause and consequences of the supply chain of agricultural sub-sectors. Overview of sub-sectors and their value chains: cattle; sheep and goats; pigs; dairy; poultry; agronomy; horticulture; game and bio-mass. Niche markets: such as Swakara and Ethical issues of Genetically Modified Organisms (GMO's) and implications to food production systems; use of examples to demonstrate how a society use result into different externalities to balance policy intervention.

Student Assessment strategies
1. Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments and practical reports (at least 4 gradable items).
2. A continuous assessment mark of at least 50% is required to gain exam admission.
3. One examination with minimum duration of 3-hours (50% of the final mark).
4. A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
5. A final mark of 50% is required to pass this course

F3520ZP BASIC PROGRAMMING WITH PYTHON

Module Title:	**BASIC PROGRAMMING WITH PYTHON**
Module Code	F3520ZP
NQF Level	5
Notional Hours	20
Contact hours	One practical session every week for the duration of CS1
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module Content
Python installation; Anaconda. Data Structures and their operations; Variables; Strings; numeric variables; Lists. Control Flow; if, else and elif statements. Functions; How to use basic functions; Numpy Arrays. Pandas; Series; DataFrames. Interaction with OS; Reading and Writing files. Data Visualization; histograms; line and scatter plots.

Student Assessment Strategies
Student assessment will be based on formative assessment only through 100% continuous assessment. The assessment comprises 1 programming assignment. A minimum mark of 50% is required pass the module.

S3531CG INTRODUCTORY PHYSICAL & INORGANIC CHEMISTRY

Module Title:	INTRODUCTORY PHYSICAL & INORGANIC CHEMISTRY
Module Code	S3531CG
NQF Level	5
Notional Hours	140
Contact hours	4 lecture periods and 1 practical session per week
Additional learning requirements	
NQF Credits	14
Prerequisite	
(Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Properties of gases: Gas laws, The kinetic molecular theory of gases, Root-mean-square speed; Thermodynamics: Concepts, The First and Second laws of thermodynamics; Thermochemistry: Exothermic and endothermic reactions, Calorimetry, Standard enthalpy changes, Standard enthalpies of formation, Hess' law, Kirchhoff's law; Entropy, Free energy and Chemical Equilibrium: The Third law of thermodynamics; Gibbs free energy, Relationship between equilibrium constants K_p and K_c, Stoichiometric numbers, The response of chemical equilibria to the conditions, The ICE table, The Van't Hoff equation, The value of K at different temperatures; Properties of solutions: Molecular view of solution process, Intermolecular forces and solutions, Types of solutions, The effect of pressure on solubility of gases, Colligative properties; Phase Equilibria: Phase diagrams,

Phase transitions, Gibbs phase rule, Clausius-Clapeyron equation, Trouton's law; Chemical kinetics: Rates of reactions, Rate laws, Integrated rate expressions, Half-life, Arrhenius equation, Collision theory (basics), Reaction mechanisms, Activation energy barrier diagrams, Catalysis (Heterogeneous, Homogeneous and Enzyme).
Electronic structure of an atom: wave nature of matter, Quantum mechanics and atomic orbitals, Electron configuration and the periodic table; Periodic trends: Atomic and ionic radii, ionization energy, electron affinities; Concepts in chemical bonding: Chemical Bonds, Lewis Symbols, and the Octet Rule, Ionic Bonding and Covalent Bonding, Bond Polarity and Electronegativity, Drawing Lewis Structures, Resonance Structures, strength; Molecular geometries and bonding theories: The VSEPR Model, Molecular Shape and Molecular Polarity, Valence Bond theory and Hybridization of atomic orbitals, Molecular Orbital theory, molecular orbital diagrams, bond order, Delocalized multiple bonds.

Student Assessment Strategies
Tests: A minimum of three tests which counts 70% towards the continuous assessment (CA) mark.
Laboratory Mark: Laboratory work is graded and the average counts 20 % towards the CA mark.
Tutorials: Each tutorial assessment is graded and counts 10% towards the CA mark.
Examination: There is a one 3hr examination at the end of the semester and counts 50% towards the final mark.
Final Mark: 50% CA mark and 50% Examination mark
To pass this course, the student must obtain a minimum final mark of 50%.

F3531CA	MATHEMATICS FOR AGRICULTURE
Module Title:	MATHEMATICS FOR AGRICULTURE
Module Code	F3531CA
NQF Level	5
Notional Hours	120
Contact hours	4 Lecture hours per week per semester; 4 Tutorial hours per week per semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
Ratios and Proportions: Share a given quantity in a specified ratio; and Use proportion to scale down or scale up quantities given a specific rate. Mathematics applications in agriculture: Calculation of various fertilizer contents; application rates; conversions in foreign markets; areas and volumes of various shapes; figures and Interest rates calculations Sets: Definition of a set; notation; equality of sets; subsets; characterization of equality via the subset relation; empty set; Venn diagrams; intersection; union; complement; proofs of simple results on set equality. Standard examples of sets: natural numbers; integers; rationals; real numbers. Cardinality of sets (examples of finite; infinite; countable; uncountable sets). Matrix Algebra: Matrices and vectors; principle of matrix multiplication; determinants; minors; cofactors and; transpose matrix; the cofactor matrix; adjoint and inverse; Cramer's rule; Solution of systems of equation; Gauss-Jordan elimination. Functions: Definition of function; Linear and non-linear function; selected nonlinear functions (exponents; and logarithms) and application in the biological field. Calculus: Differentiation and Integration of basic functions. Optimization: Review of inequalities; Linear; constrained and non-constrained problems: Review of series: Binomial and Geometric; factorial and summations notations.

Student Assessment Strategies
- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination 50% (1 x 3 hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

P3511PG	GENERAL PHYSICS I
Module Title:	GENERAL PHYSICS I
Module Code	P3511PG
NQF Level	5
Notional Hours	140
Contact Hours	Four (4) lectures, a 3-hour practical session every week with a bi-weekly 1-hour tutorial session for one semester.
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Pre-requisites	
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Mechanics: Units, Physical Quantities, and Vectors; Motion Along a Straight Line; Motion in Two or Three Dimensions; Newton's Laws of Motion; Applying Newton's Laws; Work and Kinetic Energy; Potential Energy and Energy Conservation; Momentum, Impulse, and Collisions; Rotation of Rigid Bodies; Dynamics of Rotational Motion; Equilibrium and Elasticity; Fluid Mechanics; Gravitation; Periodic Motion. Waves and Acoustics: Mechanical Waves; Sound and Hearing. Thermodynamics: Temperature and Heat; Thermal Properties of Matter; The First Law of Thermodynamics; The Second Law of Thermodynamics. Practical: Experimental techniques, reading, measuring, uncertainty/error estimation, tabulation of data, graphing, elementary hypothesis verification, practical report writing.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes, assignments, and practical reports (at least 6 gradable items).

A continuous assessment mark of at least 40% is required to gain exam admission.
One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
A final mark of 50% is required to pass this module.
To qualify for a Supplementary Exam a final mark of 45—49% is required, subject to a subminimum of 40% in the Exam.

S3512PG	GENERAL PHYSICS II
Module Title:	GENERAL PHYSICS II
Module Code	S3512PG
NQF Level	5
Notional Hours	140
Contact Hours	Four (4) lectures, a 3-hour practical session every week with a bi-weekly 1-hour tutorial session for one semester.
Additional learning requirements	None
NQF Credits	14
(Co-requisites)	
Pre-requisites	
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Electromagnetism: Electric Charge and Electric Field; Gauss's Law; Electric Potential; Capacitance and Dielectrics; Current, Resistance, and Electromotive Force; Direct-Current Circuits; Magnetic Field and Magnetic Forces; Sources of Magnetic Field; Electromagnetic Induction; Inductance; Alternating Current; Electromagnetic Waves. Optics: The Nature and Propagation of Light; Geometric Optics; Interference; Diffraction. Modern Physics: Relativity; Photons: Light Waves Behaving as Particles; Particles Behaving as Waves; Quantum Mechanics I: Wave Functions; Quantum Mechanics II: Atomic Structure; Molecules and Condensed Matter; Nuclear Physics; Particle Physics and Cosmology. Practical: More formal error propagation graphical representation of errors, interpreting errors, and their use in elementary hypothesis verification.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination (or subset) of tests and quizzes, assignments, and practical reports (at least 6 gradable items).
A continuous assessment mark of at least 40% is required to gain exam admission.
One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
A final mark of 50% is required to pass this module.
To qualify for a Supplementary Exam a final mark of 45—49% is required, subject to a subminimum of 40% in the Exam.

S3511BB	FOUNDATIONS OF BIOCHEMISTRY AND BIOLOGY
Module Title:	FOUNDATIONS OF BIOCHEMISTRY AND BIOLOGY
Module Code	S3511BB
NQF Level	5
Notional Hours	140
Additional learning requirements	None
Contact hours	4hours lectures per week for 12 weeks and 3-hour practical for the semester
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
The following topics will be covered:
The scientific method and basic methods in Biology and Biochemistry:
Microscopy, scientific drawings, scientific method and writing of scientific reports; Cellular foundation: cells as functional units of living organisms, source of energy and biosynthetic precursors, eukaryotes versus prokaryotes, cell communication, membrane receptors, intracellular receptors, local and long distance signaling; Chemical foundation: electron configuration, biomolecules; configuration and conformation; interaction between biomolecules; Physical foundation: thermodynamics of living organisms; Early development of organisms and Evolution foundation: Homology and analogy, body symmetry, cephalization, body cavities, germ layers, protostome and deuterostome development, phylogeny, natural selection, early theories of evolution; Genetics foundation: Cell cycle, cell division, genes, chromosomes, genomes, formation of gametes, different life cycles. Mendelian genetics, extensions of mendelian genetics, chromosome theory of inheritance, mutations, linked genes, sex linkages, monohybrid and dihybrid crosses, Aneuploidy and non-disjunction, epistasis, environmental effects on gene expressions, genotypes and phenotypes, gene therapy. Foundations of Microbiology: the importance of microorganisms, impacts of microorganisms on humans, microscopy and microbial cell morphology, microbial cell membranes and cell walls, microbial growth requirements, culture media, laboratory culture of microorganisms, bacterial growth in media, measuring microbial growth.

Student Assessment Strategies
Formative Assessment:
Formative assessment will make up 50% of the module grade (Tests, Assignments, Quizzes and Practical reports)
Summative Assessment:
Examination: 1 x 3h examination at the end of the semester that counts 50% towards the final mark

Final Mark: 50% CA mark and 50% Examination mark
A subminimum of 40% in the examination is required to pass, irrespective of the final mark
To pass this Module the student must obtain a minimum final mark of 50%

S3532CG	INTRODUCTORY ANALYTICAL & ORGANIC CHEMISTRY
Module Title:	INTRODUCTORY ANALYTICAL & ORGANIC CHEMISTRY
Module Code	S3532CG
NQF Level	5
Notional Hours	140
Contact hours	4 lecture periods and 1 practical session per week
Additional learning requirements	
NQF Credits	14
Prerequisite	
(Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Review of some fundamental concepts in chemistry; sampling and sample preparation; expressions of concentration and content; evaluation of analytical data; measures of accuracy and precision; random and systematic errors; aqueous equilibria; mass and charge balance equations; principles of titrimetry; acid-base titrations; titration curves and indicators; applications of acid-base titrations; gravimetric methods of analysis; common ion and diverse ion effects; precipitation titrations; indicators used in precipitation titrations; EDTA titrations (complexometric titrations); the half-cell concept; voltaic cells; overview of separation methods; nomenclature of hydrocarbons; Functional groups and their nomenclature (with chain length up to 15); introduction to stereochemistry; introduction to organic chemistry reactions including acids and bases.

Student Assessment Strategies
Tests: A minimum of three tests which counts 70% towards the continuous assessment (CA) mark.
Laboratory Mark: Laboratory work is graded and the average counts 20 % towards the CA mark.
Tutorials: Each tutorial assessment is graded and counts 10% towards the CA mark.
Examination: There is a one 3hr examination at the end of the semester and counts 50% towards the final mark.
Final Mark: 50% CA mark and 50% Examination mark.
To pass this course the student must obtain a minimum final mark of 50%.

F3512SH	HUMAN NUTRITION
Module Title:	HUMAN NUTRITION
Module Code	F3512SH
NQF Level	5
Notional Hours	130
Contact Hours	4 lecture periods per week and 1 x 3 hours practical every two week for one semester.
Additional Learning Requirements	Students are expected to carry out human nutritional project-based tasks.
NQF Credits	13
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to terminologies used in Human Nutrition: Nutrients and the major nutrients, Dietary Reference Intakes (DRI) and the 4 parts of the DRI including: Estimated Average Requirements (EAR), Recommended Dietary Allowances (RDA), Adequate Intakes (AI), and Tolerable Upper Intake Levels (UL), Estimated Energy Requirement (EER), Acceptable Macronutrient Distribution Ranges (AMDR). The nutrients in food and their role in health: chemical and physical structure and characteristics of nutrients; interactions with other nutrients, non-nutrients (phytochemicals), anti-nutrients, and drugs. Food commodities: The food and Nutrition guidelines for Namibia; Factors that determine food choices; nutrients' food sources, including food composition, the way in which foods are grown, harvested, stored, processed and prepared, and the effects of these on nutrient composition and nutritional value. Digestion of food and absorption of major nutrients; digestion, absorption, circulatory transport, and cellular uptake of the nutrient, as well as regulation of all these processes; the metabolism of the nutrient, its functions, storage, and excretion. Energy needs and food consumption; Nutrition in the Life Cycle: physiological needs (demands or requirements) for the nutrient in health and disease, and during special circumstances (pregnancy, lactation, sport events), as well as individual variability. Nutritional Disorders; Consequences of under consumption and overconsumption of nutrients; therapeutic uses of the nutrient; Diseases caused by lack /over nutrition. Nutritional value of food and diets as affected by processing; Reasons for preserving food; Methods of preservation and an understanding of the principles involved; heating; removal of moisture, reduction in temperature; Chemical preservation; general effects of cooking and preservation method; nutritional value of meals and the whole diet; Food spoilage and hygiene in the handling and storage of food.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the Course grade (i.e., at least 8 assessed practical (40%], 3 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

S3512ST	STATISTICAL METHODS

Module Title:	STATISTICAL METHODS
Module Code	S3512ST
NQF Level	5
Notional Hours	120
NQF Credits	12
Pre-requisites	None
Co-requisites	None
Compulsory/Elective	Compulsory
Contact Hours	4 lectures plus 1-hour tutorial per week/ semester
Semester Offered	2

Module Content:
Sampling and sampling distributions: sample mean, proportion, difference between means and difference between proportions. Sampling distributions related: to the Normal distribution, the Central Limit Theorem; Estimation of parameters: Point estimation; confidence intervals and hypothesis testing: for means, proportions, variances, difference in means and proportions. Chi-square test for: goodness of fit & independence. Construction and use of Index numbers: unweighted (simple aggregate index, average of price relative) and weighted index numbers (Laspereys ,Paasche and Fischer's ideal index, CPI).

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination (or subset) of the following written and/or online assessments:
Test(s) and quiz(es) – at least a minimum of 3 hours in total
Assignments – at least a minimum of 3 notional hours in total
Tutorial tests – at least 10 notional hours in total
A continuous assessment mark of 40% is required to gain exam admission.
One 3-hour examination (50% of the final mark).
A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
Continuous Assessment (at least two tests, two tutorial test and two assignments) 50%; Examination 50% (1x3 hour Examination paper).
A final mark of 50% is required to pass this course.

F3512SP FOOD PROCESSING AND TECHNOLOGY

Module Title:	FOOD PROCESSING AND TECHNOLOGY
Module Code	F3512SP
NQF Level	5
Notional Hours	130
Contact Hours	4 lectures per week ; 1 practical session every two weeks for one semester.
Additional learning requirements	Excursion (company visit)
NQF Credits	13
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Overview of the food industry: characteristics of the food industry and food systems in Namibia and the region; impact of food technology advances on food security, diets and traditional foods. Food laws and regulations: Codex alimentarius; Namibian laws and regulations; Namibian Food Safety policy; National food control system. Food Properties and their significance: Carbohydrates, proteins, lipids, minerals, vitamins, water. Food preservation: basic principles of food preservation; control of microorganisms and enzymes; food preservation methods; hurdle technology. Unit operations for food processing: Pre-processing; processing by addition or removal of heat; size reduction; separation processes; irradiation; materials handling; packaging and labeling, other unit operations.

Student Assessment
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 4 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3 hr paper). The pass mark for the module is 50%.

SECOND YEAR

U3683LA ACADEMIC LITERACY II

Module Title:	ACADEMIC LITERACY II
Module Code	U3683LA
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact Hours	Semester 0: 4 hours/week Semester 2: 2 hours/week
Prerequisite	Academic Literacy I
Compulsory/Elective	Compulsory
Semester Offered	Core Semester,1&2

Module content

The module is designed for students enrolled in a bachelor's degree, which requires them to do basic research, read and listen to specific academic material, produce specific written texts and give academic presentations. The module thus, focuses on enhancing academic reading, academic vocabulary, writing, listening and speaking.

Student assessment strategies
The module will be continuous assessment based.
Assessment will include written tests, individual and group assignments, portfolio assessments and oral presentations.

U3520LP LEADERSHIP SKILLS

Module Title:	LEADERSHIP SKILLS
Module Code	U3520LP
NQF Level	5
Notional Hours	20
Contact hours	1 x 2h per week for 6 weeks
Mode of Delivery Blended:	Face to face and online
Additional learning requirements	None
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2

Module Content
Definition and scope of leadership; History and origins of leadership; Types of leadership; Leadership versus management skills; Leader (master of self, effective manager of people, active visionary); manager; Not all leaders are managers; Not all managers are leaders; Authority versus leadership; Power versus leadership; Principles of leadership (ability, adaptive, action, empowerment, creativity, problem solving, shared); Are leaders born or made?; Characteristics of a good leader; Functions of leaders in organizations; Leading for the future; Mentoring skills; The 21st century leader; Ethical leadership skills; Responsible leadership skills.

Student Assessment Strategies
The module will be assessed using 100% continuous assessment.

U3420CN NATIONAL AND GLOBAL CITIZENSHIP

Module Title:	NATIONAL AND GLOBAL CITIZENSHIP
Module Code	U3420CN
NQF Level	4
Notional Hours	20
Contact hours	Up to 1 contact lecture periods per week for 6 Weeks
Mode of Delivery	Blended: Face to face and On
Additional learning requirements	Each student will be required to work on a personal project which will include a site visit
NQF Credits	2
(Co-requisites)	
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content
UNIT 1: Constitution and its Importance
What is a constitution; Functions of a constitution; What it contains; Constitution and democracy
UNIT 2: Global Citizenship
The meaning of global citizenship; Importance of global awareness; World issues of concern to global citizens.
UNIT 3: Civic Engagement
What do we mean by civic engagement; Dimensions of civic engagement; Indicators of civic engagement; Promoting civic engagement.
UNIT 4: Globalization
Understanding globalization; Cultural construction of neoliberal globalization; Major players; Major domains; Major Issues; Futures of Globalization
UNIT 5: Intercultural Communication
Dealing with difference; Levels of culture; Stereotypes and generalizations; Intercultural communication Processes
UNIT 6: Sustainable Development Goals and individual action
Introduction to SDGs; Contributing to achievement of SDGs through action
Learning and Teaching Strategies/Activities
Student learning in this module will be supported by provision of subject knowledge; engaging students in class discussions, and individual awareness and action portfolios. It will expose students to real life situation through formal lectures, guest lectures, experiential activities such as engaging local civic organizations; Students will engage in active and participatory learning in which they generate ideas and share their knowledge on a topic. Material will include journal articles, videos, PowerPoint presentations, as well as handouts for students' reflection.

Student Assessment Strategies
Continuous assessment of 100% - Assessment will be done by completing online pop-up quizzes; and developing their online portfolios of personal action as response to tasks assigned in class.

U3420PJ	PROJECT MANAGEMENT SKILLS
Module Title:	PROJECT MANAGEMENT SKILLS
Module Code	U3420PJ
NQF Level	5
Notional Hours	20
Contact hours	2 hour lecture per week for the first two week and field-based practical for the remaining four weeks.
Mode of Delivery	Blended: face-to-face
Additional learning requirements	The field-based practical to be undertaken in the immediate environment of the student
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2

Module Content
This module consist of two components: The first component is a two week theory covering the concepts (project vs programme) and the phases of project life cycle (project initiation and planning: work breakdown, development of SMART indicators, estimation of activity duration, efforts, and costs, scheduling of activities, identification of critical path, setting of milestones, stakeholder identification and categorization, stakeholder engagement, initial risk identification, and development of the initial project plan; project implementation & management: forming the project team, managing people, resources allocation, responsibilities allocation, quality assurance, leadership style and project liaison; project monitoring and control: progress reporting and communication, quality control, time management, budget and cost management, risk management and mitigation; project closure and evaluation: project evaluation, project auditing process and the closure process, and final project report). The second component is a four week field-based practical where students participate in a real-life project in their immediate environment. Students are strictly required to apply the project management approach during the field-based practical.

Student Assessment Strategies
Student assessment will be 100% continuous assessment based on weekly project progress reports (50%) and the final project report (50%). A minimum pass mark for the module is 50%.

U3420SE	SUSTAINABILITY AND ENVIRONMENTAL AWARENESS
Module Title:	SUSTAINABILITY AND ENVIRONMENTAL AWARENESS
Module Code	U3420SE
NQF Level	4
Notional Hours	20
Contact hours	1 x 2h per week for 6 weeks for the first 3 weeks followed by mini-project for the remainder of semester (total of 10 hours on this aspect)c
Mode of Delivery	Blended: Face to face and Online
Additional learning requirements	Mini-project to create awareness, champion environmental cause or address an environmental issue in their immediate environment
NQF Credits	2
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1 or 2

Module Content
Sustainability: finite nature of elements constituting the Earthly environment, resilience and fragility of the natural environment; three distinct perspectives on sustainability: sustained yield of resources, sustained abundance and diversity of species and ecosystems, sustained economic and social development key themes in defining sustainability: (i) the human perspective, (ii) considerations of fairness and (ii) issues of scale concepts of inter- and intra-generational equity (fair and just distribution of resources), sustainable community. Natural resources: role of soil, water and minerals in supporting life on Earth; health and interdependence of ecosystems within the biosphere; dependence of human beings on natural resources for sustenance and livelihoods. . Solutions to environmental sustainability challenges: simple inexpensive interventions aimed at reducing wastage of resources and generation of wastes through exhaustive use, reuse, recycling and refurbishing of products.

Student Assessment Strategies
The module will be evaluated using 100% continuous assessment. Student will be assessed based on class discussions and debates on striking a balance between socio-economic development and environmental sustainability citing real life major national projects. Students will be placed in groups based on a logical criterion that ensures mixing interspersing of students from academic discipline and programmes in each group. Groups will be expected to take on a particular environmental issue plaguing their immediate surroundings to highlight and champion. Each group will tackle one issue through either cleanup campaigns, awareness raising campaigns, community education campaigns, advocacy or devising a simple solution to the problem. A minimum pass mark for the module is 50%.

F3610ZR	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Title:	INTRODUCTION TO STATISTICAL PROGRAMMING WITH R
Module Code	F3610ZR
NQF Level	6
Notional Hours	80
Contact hours	4 lecture periods per week and one 3hour practical per week for core semester

Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Core semester

Module Content
Learn how to navigate RStudio: how to load/save a file; load a package; access help. Examine the base R objects: vectors; matrices, arrays, lists, factors and tables; their respective characteristics, naming conventions and structures. Understand sub-setting, filtering and creation of these objects. Examine the implementation of control structures (loops and functions) in R. Investigate how R can be used for mathematical and statistical calculations. Data Cleaning and Manipulation in R: Lear how to manipulate and clean data in R; importing and exporting data from other statistical packages and data bases; aggregating data; reshaping data Visualisation (Packages): Learn how basic plots are generated in R – histograms; X-Y plots, bar charts; pie charts, scatter plot. Understand the ggplot2 package for advanced plotting. Statistical Testing: Understand how R can be used for hypothesis testing. Investigate how R can be used in statistical modelling techniques (SLR)

Student Assessment Strategies
Continuous Assessment: 100 % (minimum of 2 tests (30%), 1 project assignment (presented in oral and written form, 40%), 3 marked practicals, 30%). The pass mark for the module is 50%

F3611SG	GENERAL MICROBIOLOGY
Module Title:	GENERAL MICROBIOLOGY
Module Code	F3611SG
NQF Level	6
Notional Hours	150
Contact hours	Four (4) hours contact lecture per week and 1 x 3 hours practical session every two week for one semester
Additional learning requirements	Field work
NQF Credits	15
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content
This course provides students with a general overview of microbiology. The first part covers a historical perspective of microbiology; how microorganisms were discovered; ancient experiments, theories and myths. The second chapter deals with their classifications; the chronology of methods used and the diversity of environments where microorganisms are found. The third chapter covers the morphology of prokaryotic microorganisms; their structures and chemical composition and subcellular organelles. The fourth chapter discusses the role of microorganisms in nature; in biogeochemical cycles (carbon and nitrogen cycles; and their application in industries will be discussed. The fifth chapter describes the morphology, biology and habitats of eukaryotic microorganisms; fungi, algae, protozoa and viruses will be studied. The sixth chapter is a synopsis of methods to control microbial growth will be given; differentiating and highlighting various physical and chemical control methods and their respective efficacies; with direct reference to the effect of antibiotics on microorganisms including their basic classification and mode of action. The seventh chapter is an overview of the important pathogens of plants and animals; common pathogens affecting livestock and crops in the tropics will be selected and discussed; fair coverage of various groups; bacteria, fungal and viral pathogens will be made; the characteristics of the causative agents; conducive conditions for their transmission and control measures will be given. The practical aspects of this module will cover, media preparation and sterilization, aseptic and pure culture techniques, microbial isolation and identification including microscopy, staining techniques, and biochemical tests. The antibiotic sensitivity assays will also be covered.

Student Assessment Strategies
Assessment activities will comprise of formative assessments (50% of the final mark), comprising of at least three tests, forum discussions, practical reports and written assignments). One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark.

F3611AB	BIOCHEMISTRY
Module Title:	BIOCHEMISTRY
Module Code	F3611AB
NQF Level	6
Notional Hours	160
Contact hours	04 Lecture hours / week; 3 Practical hours per week for one semester
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	S3511BB Foundations of Biochemistry and Biology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Structural Biochemistry: Structure and function of macromolecules (carbohydrates, proteins and lipids), Vitamins, Coenzymes and Cofactors. Enzymology: Enzymes as organic catalysts; Enzyme nomenclature; Factors affecting activities of enzymes;

Enzyme kinetics - The Michaelis-Menten equation; The Lineweaver-Burk plot; Enzyme inhibition; Allosterism. Bioenergetics and Thermodynamics: Free Energy, Laws of Energy, Activation Energy, Transition States, Endergonic and exergonic reactions. Metabolism: Catabolism and Anabolism; Carbohydrate catabolism (Glycolysis, Alcohol and lactic acid Metabolism, Tricarboxylic acid cycle or the TCA cycle; Electron transport chain and oxidative phosphorylation); Regulation of carbohydrate metabolism; Gluconeogenesis; Synthesis of the disaccharides (lactose and sucrose); Lipid metabolism (β-oxidation, malonly CoA); Integration of carbohydrate and fat metabolism; Amino acids and protein metabolism; Urea cycle; The Cori cycle; Pentose phosphate pathway. Spectrophotometry: Fundamental laws of spectrophotometry and absorbance, including calibration curve

Student Assessment Strategies
Continuous Assessment consists of 50% comprising of 2 tests, at least 3 marked practicals, quizzes / Assignment and a three-hours examination that constitutes 50% of the final grade.
Pass mark for the module is 50%.

F3601SP	POSTHARVEST TECHNOLOGY
Module Title:	POSTHARVEST TECHNOLOGY
Module Code	F3601SP
NQF Level	6
Notional Hours	70
Contact Hours	2 lecture periods per week and one 3hour practical per alternate week for one semester
Additional Learning Requirements	Compulsory visit to at least 4 Agricultural Produce and storage houses.
NQF Credits	7
(Co- requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction to postharvest: Definition of postharvest terms, introduction to postharvest losses. Physiological and biochemical characteristics of agricultural products: Ripening-physical and biochemical changes, ripening methods, Respiration and is factors affecting respiration rates in selected agricultural crops; ethylene in post-harvest technology, storage life of different agriculture produce. Constraints in post-harvest management: post-harvest deterioration, post-harvest treatment for extended post-harvest shelf life. Postharvest treatments: washing, waxing, drying methods, processing, grading, packaging techniques and packaging standards. Storage methods and transportation methods: introduction to different storage facilities modern and traditional, Cooling and pre-cooling methods in the cold chain; packaging and pack-house operations, packaging- types of containers and cushion materials and packaging methods. Modes of transport and Storage practices: constraints and transit hazards, Controlled atmosphere storage (CAS) and modified atmosphere packaging (MAP), Hypobaric storage, zero energy cool chamber, cool Bot and cool room. Storage methods for domestic and export market and compatibility of horticulture produce for storage. Effects of microorganisms and pests: microorganisms and pest control, fumigation of storage facility and good house practice before and after storage of agricultural produce such as grains, fruits and vegetables.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., at least 8 assessed practicals [combination of visiting companies and laboratory practicals] (40%], 2 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3611SM	MEAT SCIENCE AND TECHNOLOGY
Module Title:	MEAT SCIENCE AND TECHNOLOGY
Module Code	F3611SM
NQF Level	6
Notional Hours	150
Contact Hours	4 lecture periods per week and 1 x 3hour practical every two weeks for one semester
Additional Learning Requirements	Students undertakes one-day visits to industrial meat processing plants.
NQF Credits	15
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Overview of meat industry in Namibia, SADC: terms and definitions, beef breeds, employment and GDP contribution, factors affecting beef, mutton, game and poultry industry, major industries and statutory meat regulatory bodies in Namibia. Muscle anatomy and composition: structure and composition of meat, macro and micro nutrients of meat, factors affecting meat composition, meat functional proteins, meat and human nutrition. Food animal welfare: slaughtering animal welfare act of 1960, handling of slaughtering animals. Slaughtering of meat animals: animal stunning, carcass dressing, fabrication. Quality control and assurance in meat plants: Slaughterhouse/abattoir hygiene, Good Manufacturing Practices (GMP), Hazard Analysis Critical Control Points (HACCP). Biochemical process and meat quality: rigor mortis, pH and meat quality (PSE and DFD), meat colour biochemistry, meat tenderness biochemistry. Meat spoilage and preservation: microbial contamination and spoilage in meat, chemical and biochemical (enzymatic) spoilage of meat, chilling and freezing of meat, meat packaging. Meat processing and value addition: overview of meat processing industries, processed meat products, equipment used in meat processing, non-meat ingredients (seasonings, curing salts, binders, marinades and tenderizers), sausage production, meat smoking, meat canning.

Student Assessment strategies

Continuous assessment (50% of the final mark) consisting of a combination of tests and quizzes (at least 3 assignments and 5 laboratory practical reports. A continuous assessment mark of at least 40% is required to gain exam admission. One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark. A final mark of 50% is required to pass this course.

F3612SD	DAIRY SCIENCE AND TECHNOLOGY
Module Title:	DAIRY SCIENCE AND TECHNOLOGY
Module Code	F3612SD
NQF Level	6
Notional Hours	150
Contact hours	Four hours of lectures per week, 03 hours practical every two week
Additional learning requirements	Field visits to Dairy farms, Dairy processing facility and Markets
NQF Credits	15
(**Co-requisites)**	
Prerequisite	F3512SP: Food Processing and Technology
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Primary production of milk; milk production trends in Namibia. The chemistry and microbiology of milk, Raw milk handling; collection, cooling, transportation and reception of milk. Quality control tests; testing of Butterfat, Total Solids, resazurin and alcohol rests, pH, acidity test, clot-on boiling test and sediment test. The building blocks of dairy processing; Milk and milk products such as: Pasteurized/ Market milk products; cultures and starter manufacture; cultured milk products; High fat dairy products; Cheese; Whey powder processing; Concentrated Dairy Products; Recombined milk products; Ice cream; Casein powder. Cleaning of dairy equipment and Dairy Effluent Management. Marketing aspects of milk and dairy products.

Student Assessment
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., at least 8 assessed practical [40%], 3 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3612SS	SEA FOODS TECHNOLOGY
Module Title:	SEA FOODS TECHNOLOGY
Module Code	F3612SS
NQF Level	6
Notional Hours	150
Contact Hours	4 lecture periods per week and 1 x 3hour practical every two weeks for one semester
Additional learning requirements	Students may undertake an academic excursion to witness seafoods processing at various fish processing industries at the coast (Walvis Bay and Luderitz). Students will also be attached at various seafoods processing plants.
NQF Credits	15
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Classification of main fishing and production systems: Marine, fresh water/inland and aquaculture fisheries, Major industries and ecological niches Fisheries management systems: Custodian ministry and government agencies, fishing rights, total allowable catches, fishing quotas, fishing licenses, Fishery fees and levies, Economic Exclusive Zones (EEZ), maritime and fishery observers. Fishery classification and important commercial species. Fresh water fish, Marine fisheries, aquaculture species, crustaceans and mollusks). Fish structure and composition: Morphological structure of fish, crustaceans and bivalve mollusks, fish composition and human nutrition. Fish capture technologies: definitions and terminologies, major fishing systems, technological and digital navigation systems, fish holds on board vessels until landing. Preliminary fishing operations; purpose and types of operations and equipment used. Fish preservation: Fish chilling and freezing technologies, effect of freezing on fish quality, Sea foods processing plants hygiene: Good Manufacturing Practices (GMPs), HACCP). Quality evaluation of sea foods: Terminologies and definitions related to freshness of seafood, actors affecting microbiological quality of sea foods, standardized sensory evaluation schemes/indicators for evaluating fish freshness/quality. Seafood borne illness: marine toxins and seafood-borne illness (finfish and shellfish poisoning). Fish packaging. Fish processing: Production line, fish drying, salting, smoking, canning, surimi technology, concentrated fish proteins, caviar processing, battered and breaded fish products, extruded fish products, fish meal and fish oils, processing of mollusks and crustaceans.

Student Assessment strategies
Continuous assessment (50% of the final mark) consisting of a combination of tests and quizzes (at least 3 assignments and laboratory practical reports. A continuous assessment mark of at least 40% is required to gain exam admission. One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark. A final mark of 50% is required to pass this course.

F3612SE	FOOD ENGINEERING 1
Module Title:	FOOD ENGINEERING 1
Module Code	F3612SE
NQF Level	6
Notional Hours	150

Contact Hours	4 contact lectures per week for one semester; 1 practical/tutorial session per week for one semester.
Additional learning requirements	Virtual practicals
NQF Credits	15
(Co-requisites)	
Prerequisite	S3511MS: Mathematics Support I
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Units and dimensions: Identification of units commonly used in engineering calculations; conversion of units from different systems. Process variables and outcomes: Mathematical applications to determine and manipulate variables and properties common employed in food technology; determination and utilisation of process outcomes. Introduction to engineering thermodynamics applications: Application of laws of Thermodynamics in food engineering; energy calculations in common thermodynamic processes. Material and energy balances: material and energy balances to unit equipment; component balances; total material and energy balances; plant balances; use of steam tables and psychrometric charts. Heat transfer: Steady state conduction; convection; combined conduction and convection; radiation; introduction to heat exchangers. Fluid transfer: Newtonian and non-Newtonian fluids; basic Rheology; Continuity equation; application of Bernoulli's theorem. Introductory mass transfer: Analogies with heat transfer; diffusion; mass transfer coefficients; ultrafiltration; reverse osmosis.

Student Assessment
This module will be evaluated using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, assessment of at least 4 virtual laboratory practical reports, a minimum of 1 written tests. The summative assessment will comprise a written end of semester examination (1 x 3 hr paper). The pass mark for the module is 50%.

F3602SW WORKPLACE ATTACHMENT PREPARATION

Module Title:	WORKPLACE ATTACHMENT PREPARATION
Module Code	F3602SW
NQF Level	6
Notional Hours	80
Contact Hours	Lectures: 2 hours per week for one semester
Additional Learning Requirements	None
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
The importance of food science knowledge and practice in industrial attachment: Guides on how to get specific job and skill experience during field attachment. Employability-enhancing activities: gaining workplace skills and building network of company or industry contacts. Professional behavior and/or knowledge: role and expectation of student in the workplace, acceptable workplace behaviors and specific common job norms. Guide on effectiveness of field-based learning. Demonstration and discussion of ethical awareness, the ability to do ethical reflection, and the ability to apply ethical principles in decision-making. Collaboration and teamwork in a work context. Preparation to be able to identify, comment on and relate organizational, scientific and technical knowledge based on the key activities, as may be applicable, at the company/institution where attached. Organisation: Ownership, Establishment, governance and human personnel structures. Administration: Procurement procedures, adequate record keeping. Quality Assessments: Raw materials and ingredients quality and safety, Packaging Materials quality and safety, Defects and Rejects. Storage Conditions assessment: Raw Materials, Ingredients and Packaging proper storage, management and monitoring. Raw materials and Ingredients (including water) quality Analyses: Sampling Methods, Sample Preparation, Chemical, Microbiological, Physical and Instrumental tests. Plant layout: Design, materials flow, Lighting, Ventilation, Space/size. Processing Technology and Maintenance: Equipment, their design, capacity, maintenance and calibration and handling, Processing unit operation, Equipment cleaning and process control points, Embedded packaging e.g. canning (processing and packaging), Transport system (conveyor belts, screw conveyer etc); Principles of Engineering and Chemistry underlying the processing steps/unit operations. Quality Management systems: Good Manufacturing Practices (GMPs) programs, Certifications e.g. BRC, ISO, Benchmarkings (processes and/or products). Product Quality Assurance: Food safety, Hazards, CCP, HACCP system, Chemical, Microbiological, Physical and Instrumental, Shelf stability tests, Sensory tests. Packaging Technology assessments: Packaging materials (plastic, metal, wooden, paper etc), their composition, Types of packages (primary, secondary etc.), Packaging equipment: Filling/Forming and, Sealing and labelling. Consumer Perception handling: Defects and recalls, Consumer complaints, Consumer satisfaction.
Warehousing and Product Storage Conditions assessment: Product storage conditions, management and monitoring, Type of client (e.g. Individuals, Retailers), Duration of Product storage. Personnel Health and safety, occupational health, dose exposures and risks assessments in workplace: Assess risks, hazards and exposures in the working environment. Waste management, handling and safe storage of waste, pollutants and contaminants: Waste and pollution control, handling, transporting and disposal of waste. Policy and legislation: Follow debates and legislative process through which policies and laws are made (processing, products, composition e.g. GMOs, packaging, Wastes etc.

Student Assessment Strategies
Assessment for this module will consist of formative activities, and the final mark will be made of 100% Continuous Assessment (CA). The CA will be made up of seminars (30 %) and field-based learning plan (70 %).

W3710SW WORKPLACE ATTACHMENT

Module Title:	WORKPLACE ATTACHMENT
Module Code	W3710SW
NQF Level	7
Notional Hours	240
Contact Hours	8 weeks
NQF Credits	24
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester

Course content:
This is a practical course where students spend time at real work situations under the supervision of qualified personnel. The students are attached to suitable food processing industries or food analytical laboratories. Students will be required to go for their industrial internship for 8 weeks in semester zero and semester 1 at the beginning of the third year. Attached students should conduct themselves in professional manner, be punctual at all times, as well as maintain a positive attitude towards others and their work. Students are required to stay on duty till the last day of the attachment period. Failure to do so may result in the repetition of the attachment at student's own cost. Absence from the site of duty may only be authorized by the site management in writing. Weekends should be considered part of the attachment period, therefore students on attachment may be required to report for duty during weekends should the need arise.
Students are engaged in activities such as: Quality Assessments: Raw materials and ingredients quality and safety, Packaging Materials quality and safety, Defects and Rejects. Storage Conditions assessment: Raw Materials, Ingredients and Packaging proper storage, management and monitoring. Raw materials and Ingredients (including water) quality Analyses: Sampling Methods, Sample Preparation, Chemical, Microbiological, Physical and Instrumental tests. Plant layout: Design, materials flow, Lighting, Ventilation, Space/size. Processing Technology and Maintenance: Equipment, their design, capacity, maintenance and calibration and handling, Processing unit operation, Equipment cleaning and process control points, Embedded packaging e.g. canning (processing and packaging), Transport system (conveyor belts, screw conveyer etc); Principles of Engineering and Chemistry underlying the processing steps/unit operations. Quality Management systems: Good Manufacturing Practices (GMPs) programs, Certifications e.g. BRC, ISO, Benchmarkings (processes and/or products). Product Quality Assurance: Food safety, Hazards, CCP, HACCP system, Chemical, Microbiological, Physical and Instrumental, Shelf stability tests, Sensory tests. Packaging Technology assessments: Packaging materials (plastic, metal, wooden, paper etc), their composition, Types of packages (primary, secondary etc.), Packaging equipment: Filling/Forming and, Sealing and labelling. Consumer Perception handling: Defects and recalls, Consumer complaints, Consumer satisfaction. Warehousing and Product Storage Conditions assessment: Product storage conditions, management and monitoring, Type of client (e.g. Individuals, Retailers), Duration of Product storage. Personnel Health and safety, occupational health, dose exposures and risks assessments in workplace: Assess risks, hazards and exposures in the working environment. Waste management, handling and safe storage of waste, pollutants and contaminants: Waste and pollution control, handling, transporting and disposal of waste. Policy and legislation: Follow debates and legislative process through which policies and laws are made (processing, products, composition e.g. GMOs, packaging, Wastes etc.
Learning and Teaching Strategies/Activities
Presentations and written reports

Student Assessment Strategies
Assessment by Field Supervisor = 30%
Oral presentation = 20%
Written report = 50%

F3711SF FRUITS AND VEGETABLES TECHNOLOGY

Module Title:	FRUITS AND VEGETABLES TECHNOLOGY
Module Code	F3711SF
NQF Level	7
Notional Hours	170
Contact Hours	4 lecture periods per week and one 3hour practical per alternate week for one semester
Additional learning requirements	Visit to fruits and vegetable processing companies and fruits and vegetables packers
NQF Credits	17
(Co-requisites) Prerequisite	F3601SP: Postharvest Technology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Classify fruit and vegetable: Types of fruits and vegetables, their differences, uses and economic importance, structure and composition, maturation, quality evaluation and handling. Nutritional quality of fruits and vegetables: Interpret the nutritional quality of fruits and vegetables and determine the quality of fruits and vegetables for processing and in the diet. Quality deterioration: enzymatic, chemical, physical, biological changes and stability of nutrients. Shelf life of Fruits and vegetables: Extension of shelf life of fresh fruits and vegetables and Shelf life of processed fruit and vegetable products. Preprocessing and treatments of fruits and vegetables: washing, peeling, dicing, segmenting, slicing, pitting/decoting, sulphite treatment, blanching and draining. Processing methods for fruits and vegetables: juicing, freezing, concentration, drying, canning. Chemical preservation: salting, smoking, acidification, addition of ethanol and preservatives. Others: pasteurization, sterilization, canning and irradiation. Products processing: Drinks/Concentrates; Juices, Wines, Ciders, Nectars, Squashes, Cordials and Syrups, Jams, Jellies, Marmalades, Catsup, Paste, Confectionary, Pickles, Sauerkraut, Dried fruits and vegetables,

Packaging and Labelling. Fermentation and other beverages: wines, ciders, pickles and carbonated beverages. Packaging, Good Manufacturing Practice (GMP), Hazard analysis critical control points (HACCP). Quality evaluation and compliance to quality standards and legislation for processing fruits and vegetable products

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 60% of the module grade (i.e., at least 6 assessed practicals (40%], 2 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 40% (1x 3 hours theory paper). Pass mark for the module is 50%.

F3701SM	FOOD MICROBIOLOGY
Module Title:	FOOD MICROBIOLOGY
Module Code	F3701SM
NQF Level	7
Notional Hours	80
Contact hours	2 contact lectures per week for one semester; 1 x 3 hours' practical alternate week for one semester.
Additional learning requirements	Excursions
NQF Credits	8
(Co-requisites)	
Prerequisite	F3611SG: General Microbiology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
The first charter deals laboratory techniques used in the isolation, enumeration, and identification of microorganisms in food; cultural and noncultural methods of enumeration; types of growth media and methods used in the isolation and enumeration; primary, secondary identification and culture confirmation techniques; biochemical tests and rapid methods of enumeration and identification. The second chapter discusses the kinetics of multiplication of microorganisms: batch cultures, bacterial growth rates, the four growth phases, factors affecting growth of microorganisms in food and continuous culture techniques. The third chapter deals with the microbiological principles of food processing and preservation: Factors affecting the growth and survival of microorganisms in food, and how these factors are utilised in creating growth hurdles in food processing. The fourth chapter covers food microbiology and public health; it differentiates natural poisons from microbiological food poisoning; toxigenic from infectious food poisoning; the phenotypic characters of infections bacterial agents and summarises the pathogenesis and manifestations of the diseases. The fifth chapter discusses the sampling and sampling plans used in food microbiology; the rational behind sampling plans are defined; the class attribute plans, choosing a plan stringency, variables of acceptance sampling concepts are covered. The sixth chapter covers indices of sanitation in Food; the general criteria on which indicator organisms are bases; the heterotrophic plate counts; coliform counts; the count for sulphate reducing microorganisms counts are used as examples; significance, and shortfalls are highlighted; and the details used in performing the selected tests are discussed. The seventh chapter discusses the biochemical reactions of microorganisms in food: the role of microorganisms and food spoilage; the metabolism of carbohydrates, proteins, lipids; their respective metabolic products and the effect of the products on food quality and safety are introduced.

Student Assessment Strategies
Assessment activities will comprise of tests, written exams, assignments, forum discussions, practical reports, internal and external moderation/examination. Continuous Assessment will contribute 50% (minimum 2 tests, 1 forum discussion, 1 assignment and 4 practical reports). The final examination, will comprise of 1 x 3h paper contributing 50%. Pass mark for the module is 50%.

F3711SC	FOOD CHEMISTRY
Module Title:	FOOD CHEMISTRY
Module Code	F3711SC
NQF Level	7
Notional Hours	170
Contact hours	Four (4) contact lecture periods per week for one semester; Three (3) hours practical session every two weeks for one semester.
Additional learning requirements	Compulsory group work
NQF Credits	17
(Co-requisites)	
Prerequisite	F3611AB: Biochemistry
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Water: Its chemistry and role in food processing and technology. The chemistry of important carbohydrates in foods: monosaccharides, oligosaccharides, polysaccharides, related compounds and their role on sensory properties. Protein and amino acids chemistry in foods: Sensory properties of amino acids and protein. Animal and plant proteins: Cereals; Legumes; Red meat; White meat; Egg; Milk; Edible insect; Truffle. Nature, function and utilization of enzymes in food industry. Lipid chemistry as applied to foods and their role on sensory properties: free fatty acids, fats, glycerides, phospholipids, glycolipids, waxes and cutins; Factors that influence lipid deterioration; Emulsions and emulsifiers; Hydrogenation; Interesterification; Fractionation. The role of minerals in foods and food processing and their role on sensory properties: Major minerals and trace elements in food processing; The fat-soluble vitamins and water-soluble vitamins in foods and food processing. Sensory compounds: Colour, texture, aroma/flavour, taste and off-flavours compounds. Food additives: Colouring agents; Sugars and

sweeteners; Thickening agents and Humectants; Antioxidants; Flavour enhancers; Surface-active agents; Anti-caking agents and Bleaching agents; Clarifying agents, Propellants and protective gases. Functional foods: Chemistry mechanism of their components including phenolics.

Student Assessment Strategies
Continuous Assessment: 50%
At least 2 tests
At least 2 assignments/group work
Practical reports
Exam: 50% (1 x 3hr paper).
To pass this module a student should obtain a minimum final mark of 50%.

F3701SE FOOD ENGINEERING II

Module Title:	FOOD ENGINEERING II
Module Code	F3701SE
NQF Level	7
Notional Hours	90
Contact Hours	4 contact lectures per week for one semester; 1 practical/tutorial session per week for one semester.
Additional learning requirements	Excursion (Company visits)
NQF Credits	9
(Co-requisites)	
Prerequisite	F3612SE: Food Engineering I
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Heat and mass transfer applications: Unsteady state heat and mass transfer; psychrometrics and dehydration; sterilisation and heat penetration; refrigeration and freezing; evaporation; distillation; extraction; membrane separation and related unit operations. Fluid transfer: Pressure drop in hydraulic systems; Pump power requirements; pump selection and applications. Plant design: plant layout; plant operation and control; structural aspects; hygienic aspects of design; auxiliary equipment. Emerging food engineering technologies: Review of emerging technologies and their current and potential applications.

Student Assessment
This module will be evaluated using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, assessment of oral presentation and written report of project, virtual and lab report assessment and at least one written test. The summative assessment will comprise a written end of semester examination (1x3 hr paper). The pass mark for the module is 50%.

F3702SB FOOD BIOTECHNOLOGY

Module Title:	FOOD BIOTECHNOLOGY
Module Code	F3702SB
NQF Level	7
Notional Hours	80
Contact hours	Two (2) contact lecture hours per week for one semester; one practical session every two weeks for one semester
Additional learning requirements	Field trips
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory.
Semester Offered	2

Module content
Food biotechnology, an overview; importance, advances, trends and implications. Genetic engineering techniques; restriction enzymes, DNA cloning; Types of cloning vectors; Plasmid vectors; cosmid vectors; viral vectors; cell transformation and selection for transformants. Enzyme engineering and immobilization techniques; Classes of enzymes; Use of selected enzymes; Proteases, Amylases, cellulases, lipases; Enzyme immobilisation techniques; adsorption; covalent binding (cross linkage); entrapment; membrane confinement (Encapsulation). Fermentations; an overview of traditional versus modern fermentation technologies; Factors affecting the fermentation process , Scale up operations. Downstream processing; The five stages of downstream processing; Solid-Liquid Separation; Release of intracellular Products; (3) Concentration; Purification; Formulation. Biosafety risk assessment and risk management; the Namibian biosafety framework.

Student Assessment Strategies
Assessment activities will comprise of tests, written exams, assignments, forum discussions, practical reports, internal and external moderation/examination. Continuous Assessment will contribute 50% (minimum 2 tests, 1 forum discussion, 1 assignment and 3 practical reports). The final examination (comprise of 1 x 2h paper) will contribute 50%. To pass this module a student should obtain a minimum final mark of 50%.

F3712CB BIOMETRY

Module Title:	BIOMETRY
Module Code	F3712CB
NQF Level	6
Notional Hours	160
Contact hours	4 Lecture hours per week per semester 2 hour tutorial sessions per semester
Additional learning requirements	None
NQF Credits	16
(Co-requisites)/ Prerequisite	S3512ST: Statistical Methods
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Experimental design: Basic experimental terms; Principles of experimental design; Types of designs CRD; RCBD; Latin Square; Factorial; Split plot; Split-split plot and Repeated Measures designs; one-way and two-way ANOVA; assumptions and ANOVA model diagnostic checks. Parametric and non-parametric tests: comparison between parametric and non-parametric tests; Non-parametric test- Goodness of fit and test of association; paired and independent test in non-parametric; Kruskal-Wallis test; Friedman and Runs test. Multivariate techniques: PCA; CA; Path Analysis; FA; Canonical Correspondence; multidimensional scaling and Genotype × environment Interaction Analysis. Response Surface Methodology: Central Composite designs and Box-Behnken designs. Multiple Linear Regression: MLR model; Analysis and building a MLR; testing the usefulness of the MLR model. Survey Methods: Sampling Frame; Modes of data collection; research designs; and questionnaire design and reliability analysis.

Student Assessment Strategies
Continuous assessment (at least 2 tests; 2 tutorial test and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper). To pass this module a student must obtain a minimum final mark of 50%.

F3702SP PRODUCT DEVELOPMENT

Module Title:	PRODUCT DEVELOPMENT
Module Code	F3702SP
NQF Level	7
Notional Hours	90
Contact Hours	2 lecture periods per week and one 3hour practical per week for one semester
Additional Learning Requirements	Compulsory visit to at least 4 food processing company including SMS.
NQF Credits	9
(Co- requisites)	
Prerequisite	F3512SP: Food Processing and Technology
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction to product Development: definitions and concepts describing the process of product development, the need for new product development (NPD). Food choice: how consumers perceive food quality, children and food choices, gender and food choice. NPD process: from idea generation and screening Discuss the new product development process in detail under the following headings: Screening, Feasibility, Development, Commercialization and Maintenance. The laddering technique, the quality functions development method. The principal of food processing toward achieving a consumer perceived product. Novel approaches for consumer involvement: Qualitative and quantitative research. Marketing issues to identify product niche, Product criteria and market research and survey. Problem for product refinement diagnosis, Legislation, labeling of new food product and shelf life determination. Price determination and price discovery for product in the markets

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 70% of the module grade (i.e., at least 6 assessed practicals (40%], 2 tests [30%] and 2 assignments, assessed as written [10%]) and final Product presentation [20%]) and a summative assessment (end of semester examination) 30% (1x 2 hours theory paper). Pass mark for the module is 50%.

F3712SS FOOD AND SENSORY ANALYSIS

Module Title:	FOOD AND SENSORY ANALYSIS
Module Code	F3712SS
NQF Level	7
Notional Hours	170
Contact hours	4 lecture periods per week and one 3-hour practical alternating week for one semester
Additional learning requirements	
NQF Credits	17
(Co-requisites)	
Prerequisite	F3711SC: Food Chemistry
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Introduction and Stages of Food Analysis: Selection of sample and preparation, Selection and validation of methods, Official methods versus Rapid methods, Nutritional labelling, Data analysis and evaluation, Food compositional analyses (moisture, ash, protein, fat, carbohydrate, fibre, vitamins and minerals). Food Analytical Methods: High Pressure Liquid Chromatography

(HPLC), Gas Chromatography, Spectroscopy, Atomic Absorption Spectroscopy, Inductively Coupled Plasma- Mass Spectrometry (ICP-MS), Immunoassay methods, Nuclear Magnetic Resonance (NMR), Thermal Analysis, Colour analysis, Food rheological properties analyses, Protein separation and characterization techniques, Food contaminants and residues. Sensory Evaluation: The role of human senses, psychology and physiology in the sensory perception of food, product attributes and sensory perception and thresholds, sample preparation and serving, good sensory practices, sensory training and procedures, sensory evaluation of texture, colour and appearance of food, sensory evaluation facilities, sensory profiling methods, difference tests, affective tests in consumer analysis, descriptive sensory analysis, statistical methods for sensory data and interpretation, sensory quality and shelf-life studies, application of sensory evaluation in food product development

Student Assessment Strategies
Continuous Assessment: 50% (minimum 2 tests, 2 assignments and 7 x marked practicals). Examination: 50% (1 x 3hr paper). Pass mark for the module is 50%.

FOURTH YEAR

F3810SR RESEARCH PROPOSAL

Module Title:	RESEARCH PROPOSAL
Module Code	F3810SR
NQF Level	8
Notional Hours	140
Contact hours	At least 4 contact lecture per week for semester 0
Additional learning requirements	
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester

Module Content
Finding the research gap, principles and ethics of research. Components of research proposals.

Student Assessment Strategies
Assessment for this module will consist of formative tasks, and the final mark will be made of 100% Continuous Assessment (CA). The CA will be made up of a written research proposal (100%). To pass this module a student should obtain a minimum final mark of 50%.

F3883SR RESEARCH PROJECT

Module Title:	RESEARCH PROJECT
Module Code	F3883SR
NQF Level	8
Notional Hours	160
Contact hours	At least 2 contact lecture periods per week for two (2) semesters; practical session per week for two (2) semesters
Additional learning requirements	
NQF Credits	16
(Co-requisites)	
Prerequisite	(F3810SR, Research proposal); (F3712CB, Biometry)
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content
Principles and ethics of Research. Factors influencing research. Criteria for scientific method
Components of research proposals and projects. Basics of research in a nutshell (Scientific experimentation and writing a scientific paper).

Student Assessment Strategies
Written Proposal: 10%
Proposal presentation: 10%
Progress presentation: 10%
Final presentation: 10%
Project Report: 60%
To pass this module a student should obtain a minimum final mark of 50%.

F3820SD DESIGN THINKING

Module Title:	Design Thinking
Module Code	F3820SD
NQF Level	8
Notional Hours	80
Contact Hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8

(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Content.

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods, problem statement formulation; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy). Design Thinking Process: Five stages of design thinking (Empathise, Define, Ideate, Prototype, Test); Co-Creation and design thinking: promoting food and nutrition security. Design Thinking and Food Innovation: typical applications in the food sector.

Student Assessment
The module will be evaluated using 100% continuous assessment (at least four (4) assignments and presentations). A minimum pass mark for the module is 50%.

F3811SE FOOD ENTREPRENEURSHIP AND MANAGEMENT

Module Title:	FOOD ENTREPRENEURSHIP AND MANAGEMENT
Module Code	F3811SE
NQF Level	8
Notional Hours	180
Contact Hours	4 contact lectures per week for one semester
Additional learning requirements	Mini project
NQF Credits	18
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content.
On completing the module students should be able to:
Fundamentals of economics in a global context overview: Economic resources; supply, demand and pricing; elements of regional and global trade. Business Strategy: Strategic management process; external environment evaluation; internal capabilities analysis; product differentiation; cost leadership. Development of food enterprise value chains: Mapping, analysis; management and strengthening of food enterprise value chains. Food processing venture creation: Identifying and screening business opportunities; feasibility analysis; process economics; viable business model development and operationalizing; business planning for a new venture. Food Marketing: Product attributes, market segmentation; configuring marketing mix; marketing plan development; product management. Business Ethics: Ethical values and principles; ethics issues in business resourcing and marketing; ethics in corporate governance; corporate social responsibility; sustainability. Supply Chain Management Issues: Key issues; centralized vs decentralized systems; supply chain integration; make or buy decision; distribution and logistics in supply chain. Emerging opportunities in food processing: Review of emerging food processing technologies and business opportunities; needs driven innovation.

Student Assessment strategies
This module will be evaluated using both formative and summative assessment, each contributing 50% to the final mark. The formative assessments will include at least 2 assessed written assignments, a minimum of 2 written tests and one mini project submission. The summative assessment will comprise a written end of semester examination (1x3 hr paper). The pass mark for the module is 50%.

F3801SQ QUALITY MANAGEMENT SYSTEMS

Module Title:	QUALITY MANAGEMENT SYSTEMS
Module Code	F3801SQ
NQF Level	8
Notional Hours	90
Additional learning requirements	
Contact Hours	2 lecture periods per week for 12 weeks and 1 X 2 hour practical session every two weeks for one semester
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Introduction to food quality management systems: terms and definition, quality and safety in food industries, food quality attributes, factors influencing food quality, application of quality control to food enterprises business processes, Deming principles, Sanitary and Phyto-Sanitary (SPS) agreements. Codex Alimentarius Commission: terms, definitions, purpose and scope of the CAC. Pre-requisite requirements: GMPs (Good Manufacturing Practices); GHPs (Good Hygiene Practices), GAPs (Good Agricultural Practices), SOPs (Standards Operating Procedures). HACCP (Hazard Analysis Critical Control Points): terms and definitions, HACCP preliminary steps, development and implementation of HACCP Principles. Other food quality assurance systems: Global Food Safety Initiative (GFSI), British Retail Consortium (BRC), Fast Moving Consumers Goods (FMCG). Quality management systems (ISO 9001), FOCUS – PDCA cycle/Deming cycle. Integrated Food Safety Management Systems-

ISO 2200: main elements of ISO 22000. Environmental Management Systems –ISO 14001: relate the impact of food processing operations on the environment, background and evolution of ISO 14001, elements of ISO 14001. General requirements for the competence of testing and calibration laboratories- ISO/IEC 17025:2017: Background of ISO/IEC 17025:2017, main elements of ISO/IEC 17025:2017, relate the application of the standards to laboratories serving food industries. Food laws and regulation in Namibia: structure and functions of Namibian food control systems. Risk analysis in food safety: components of food safety risk analysis.

Student Assessment strategies
This module will be evaluated using both formative and summative assessment, each contributing 50% to the final mark. The formative assessments will include at least 2 assessed written assignments, a minimum of 2 written tests and one mini project submission. The summative assessment will comprise a written end of semester examination (1x3 hr paper). The pass mark for the module is 50%.

F3811SG	GRAINS AND CEREAL PROCESSING
Module Title:	GRAINS AND CEREAL PROCESSING
Module Code	F3811SG
NQF Level	8
Notional Hours	190
Contact hours	4 lecture periods per week and one 3hour practical per alternating week for one semester
Additional learning requirements	
NQF Credits	19
(Co-requisites)	
Prerequisite	F3601SP: Postharvest technology; F3711SC: Food Chemistry
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Types of cereals and pseudo cereals: general characteristics, origin, cultivation, production, yield, and economic importance. Chemistry of Cereals: Chemical composition and nutritional value of cereal grains and its contribution to the human diet. Grain handling and factors that cause losses to cereals: Quality control and assessment of cereal grains, Germination, milling of different cereals, Use of roller milling, treatments of wheat flour, Flour quality. Processing and characterization of cereal products: Tortillas, Baking principles and technology: bread, cakes, biscuits. Breakfast cereals: hot cereals, ready to eat cereals, flaking, puffing extrusion. Pasta Products: spaghetti, macaroni, noodles, Industrial uses of cereals: biochemicals, bioplastics, animal feed products

Student Assessment Strategies
Four lectures per week for a semester; Practical for 3 hours every alternate week for a semester. Continuous Assessment: 50% (minimum 2 tests, 1 assignment and 5 x marked practical, 1 x portfolio). Examination: 50% (1 x 3hr paper). A pass mark of 50% is required in this module.

F3812ST	FOOD TOXICOLOGY
Module Title:	FOOD TOXICOLOGY
Module Code	F3812ST
NQF Level	8
Notional Hours	190
Contact hours	Four (4) contact lecture periods per week for one semester; one practical session per week for one semester
Additional learning requirements	None
NQF Credits	19
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Toxicology terms and definitions; toxicology; toxicity; risk acute toxicity and chronic toxicity. Toxicokinetics; absorption, distribution, biotransformation and excretion; Toxicodynamics; toxicity measurements NOEL, NOAEL (No Observed Adverse Effect Level), Median lethal dose (LD50), Median effective dose (ED50) Median toxic dose (TD50). Common effects of chemicals to cause symptoms; interference, depression or stimulation of the central nervous system (CNS), effect on internal organs (lungs, local damage). Types of toxicity; chemical, biological, physical, chronic and acute toxicity. Biochemical aspects of toxicity; Phase I and Phase II reactions; biochemical and toxic effects of toxicants. Natural toxic constituents of foods; Aquatic biotoxins, Cyanogenic glycosides, Furocoumarins, Lectins, Mycotoxins, Solanine and chaconine, poisonous mushrooms, alkaloids, how to minimize health risk from natural toxins. Contaminants and food additives; pesticides, heavy metals, nitrates and organophosphates. Food spoilage, food borne diseases; manifestations of toxic effects and their remedies will be covered. Remedial actions of food toxicity; food plant sanitation and hygiene, food inspection and food legislation in Namibia.

Student Assessment Strategies
Continuous assessment (50% of the final mark) consisting of a combination of tests and quizzes, assignments and practical reports. A continuous assessment mark of at least 40% is required to gain exam admission. One examination with minimum duration of 3-hours (50% of the final mark). A subminimum of 40% in the examination is required to pass, irrespective of the final mark. A final mark of 50% is required to pass this course.

F3802SB	BEVERAGE SCIENCE AND TECHNOLOGY
Module Title:	BEVERAGE SCIENCE AND TECHNOLOGY
Course Code	F3802SB
NQF Level	8
Notional Hours	90
Additional learning requirements	
Contact Hours	2 lecture periods per week and 1 x 3hour practical every two weeks for one semester
NQF Credits	9
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Classification of beverages: alcoholic and non-alcoholic and their further sub-classes based on their use as natural and synthetic, carbonated and non-carbonated, hot and cold, stimulating and non-stimulating. Water: packaged drinking water, the manufacturing process of raw and processed water, methods of water treatment, quality standard (for bottled water, mineral water, natural spring water, flavoured water, carbonated water). Fruit juice and fruit nectar: composition, chemical and physical properties, reconstituted juice, not-from-concentrate juice, processing technologies, standards and specifications. Milk: plant and animal milk, fermented and non-fermented milk, processing technologies, quality assurance, traditional products. Tea, Coffee, Cocoa: types of tea unfermented, fully fermented and semi-fermented, instant tea and coffee, iced tea and coffee, powder coffee, traditional products. Beer: ales and lager beer, malting technologies, mashing, fermentation, traditional products. Wine: white and red wine, sparkling and non-sparkeling wine, champagne, fermentation. Spirits: ingredients, liquor, liqueur, fermentation, distillation, traditional products.

Student Assessment Strategies
Student assessment for this Course will consist of formative and summative tasks. Formative assessments will make up 50% of the course grade (i.e., at least 8 assessed practicals (40%], 3 tests [40%] and 2 assignments, assessed as written [10%]) and seminar presentation [10%]) and a summative assessment (end of semester examination) 50% (1x 2 hours' theory paper). Pass mark for the module is 50%.

F3812S0	OILSEEDS PROCESSING SYSTEMS
Module Title:	OILSEEDS PROCESSING SYSTEMS
Module Code	F3812S0
NQF Level	8
Notional Hours	190
Contact hours	Four (4) contact lecture periods per week for one semester; Three (3) hours practical session every two weeks for one semester.
Additional learning requirements	Compulsory group work
NQF Credits	19
(Co-requisites)	
Prerequisite	(F3711SC: Food Chemistry) F3512SP: Food Processing and Technology
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
Review the lipid chemistry: including the structure of common chemical reactions and simple physical properties. concepts and theories of seed decortications: Introduce the concepts and theories of seed decortications focusing on simple decorticators, graters, pulverisers, heaters, roasters, expellers and presses. Edible Oil Extraction methods: include Water-assisted, Water extraction, Mechanical extraction, Solvent extraction, Centrifugation, Supercritical Fluid Extraction. Animal fat rendering: Unit operations including packaging and storage. Edible oils and fats classification: Crude, virgin, extra virgin, refined. Edible oils and fats refining: Chemical and physical refining processes. Small scale and commercial Storage and extraction systems: Assess the issues relating to establishing a small scale and commercial extraction of fats and oils, oil refinery, oil storage and packaging. Edible oils and fats modification technology: Hydrogenation; Interesterification; Fractionation. Chemistry and Processing: Outline the chemistry and processing steps/unit operations in the manufacturing of oil products e.g. cooking oil, shortenings, margarine, lard, butter and salad oils. Shelf-life and quality: Demonstrate the importance of shelf life, side reactions during processing and food preparation. Quality assurance: Evaluate parameters of importance in product utilization and quality control and assurance.

Student Assessment Strategies
Continuous Assessment: 50%
At least 2 tests
At least 2 assignments/group work
Practical reports
Exam: 50% (1 x 2hr paper).
To pass this module a student should obtain a minimum final mark of 50%.

E.2.4 DEPARTMENT OF CROP PRODUCTION AND AGRICULTURAL TECHNOLOGIES

E.2.4.1 BACHELOR OF SCIENCE CROP PRODUCTION (LEVEL 7) 31BSCP OGONGO CAMPUS

ADMISSION REQUIREMENTS

(i) To be admitted into the **Bachelor of Science in Crop Production degree**, a candidate should have obtained the following grades at NSSCAS/NSSCO level or equivalents from a recognized qualification:

Subject to School-Specific Regulations, the normal basic requirement for entrance to the **Bachelor of Crop Production Degree** programme shall be:

- Two (2) subjects on the NSSCAS level and obtained a "d" or higher, including Agriculture/Biology and one of Mathematics, Physics/Chemistry,
- Three (3) subjects on NSSCO level with a C or higher and should include at least one of Mathematics, and Agriculture/Biology.
- English must be at minimum C grade on the NSSCO level

OR

- Three (3) subjects on NSSCAS level with a "d" including Biology and one of Mathematics, Physics/Chemistry.
- Two (2) subjects on NSSCO level with a D or higher and should include at least one of Mathematics, and Agriculture/Biology.
- English must be at minimum C grade on the NSSCO level

(ii) Applicants in possession of a Diploma in Sustainable Crop Production and Technologies or an equivalent qualification at NQF Level 6 are eligible to apply for the Bachelor of Science in Crop Production degree programme. The applicants will be admitted based on a pass at the diploma level and will be exempted from 147 (37%) of the 395 total credits of the Bachelor of Science in Crop Production degree programme.

PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisites)/ Pre-requisites	Contact hours per week (L/P/T)
Year 1 Core Semester						
U3583AL	Academic Literacy I	5	8	C	None	40 hours
U3403FS	Skills Portfolio	4	0	C	None	
U3583DD	Digital Literacy	4	8	C	None	Sem 0: 4hr/wk Sem 1: 2hr/wk Sem 2: 2hr/wk
F3500ZI	Issues in Agriculture	4	4	E	None	20 hr
F3520ZP	Basic Programming with Python	5	4	E	None	20 hr
Total Credits Core Semester			24			
Year 1 Semester 1						
F3511AB	Introduction to Biochemistry	5	14	C	None	L(4hr/wk), P(3hr/wk)
F3511CP	Soil Science	5	14	C	None	L(4hr/wk), P(3hr/wk)
F3531CA	Mathematics for Agriculture	5	12	C	None	L(4hr/wk), T(2hr/wk)
F3501CW	Basic Weed Science	5	7	C	None	L(2hr/wk), P(3hr/alt.wk)
F3521CG	Principles of Agronomy	5	7	C	None	L(2hr/wk), P(3hr/alt.wk)
Total Credits Semester 1			54			
Year 1 Semester 2						
F3512CI	Introduction to Statistics	5	12	C	Mathematics for Agriculture	L(4hr/wk), T(3hr/wk)
F3532CL	Agro-Climatology	5	14	C	None	L(4hr/wk), T(3hr/wk)
F3502AM	Principles of Microbiology	5	8	C	Introduction to Biochemistry	L(2hr/wk), P(3hr/wk)
F3502CN	Plant Genetics	5	7	C	None	L(2hr/wk), P(3hr/alt.wk)
F3522CS	Plant Science	5	14	C	None	L(4hr/wk), P(3hr/alt.wk)
Total Credits Semester 2			55			
Total credits Year 1			133			

Year 2 Core Semester

U3683AL	Academic Literacy II	5	8	C	None	Sem 0: 4hr/wk Sem 2: 2hr/wk
U3420CN	National and Global Citizenship	4	2	E	None	L(1hr/wk)
U3420PJ	Project Management Skills	5	2	E	None	20 hours
U3420EM	Ethics and Morality	4	2	E	None	L(2hr/wk online)
U3520LP	Leadership Skills	5	2	E	None	L(2hr/wk for 6wk)
F3610ZR	Introduction to Statistical Programming with R	6	8	E	None	L(4hr/wk), P(3hr/wk)
Total Credits Core Semester			24			
Year 2 Semester 1						
F3611CK	Crop Ecophysiology	6	16	C	Plant Science	L(4hr/wk), P(3hr/wk)
F3631CC	Field Crop Production	6	16	C	None	L(4hr/wk), P(3hr/wk)
F3552CM	Plant Propagation and Nursery Management	5	8	C	None	L(2hr/wk), T(2hr/wk)
F3601CY	Principles of Plant Breeding	6	16	C	Plant Genetics	L(4hr/wk), P(3hr/wk)
Total Credits Semester 1			56			
Year 2 Semester 2						
F3612TE	Agricultural Engineering	6	16	C	Mathematics for Agriculture	L(4hr/wk), P(3hr/wk)
F3612CD	Soil Fertility and Plant Nutrition	6	16	C	Soil Science	L(4hr/wk), P(3hr/wk)
F3632EE	Agricultural Extension and Group Dynamics	6	14	C	None	L(4hr/wk), P(3hr/wk)
F3602CJ	Preparation for Crop Production Project	6	8	C	None	L(4hr /wk)
Total Credits Semester 2			54			
Year 2 Total Credits			134			
Year 3 Core Semester						
W3700CZ	Field Attachment for Crop Science	7	24	C	None	4-6 months continue in Sem 1
Total Credits Core Semester			24			
Year 3 Semester 1						
F3701CU	Crop Production Project	7	9	C	Preparation for Crop Production Project	P(4hr/wk)
F3721CH	Integrated Crop Protection	7	9	C	None	L(2hr/wk), P(3hr/alt.wk)
F3711CV	Vegetable Production	7	18	C	None	L(4hr/wk), P(3hr/wk)
F3712EE	Entrepreneurship	7	16	C	None	L(4hr/wk), P(3hr/wk)
Total Credits Semester 1			52			
Year 3 Semester 2						
F3712CB	Biometry	7	16	C	Introduction to Statistics	L(4hr/wk), P(3hr/wk)
F2502CY	Plant Biochemistry	7	18	C	Introduction to Biochemistry	L(2hr/wk), P(3hr/alt.wk)
F3752TI	Soil Conversation and Irrigation Technology	7	18	C	Soil Science	L(4hr/wk), P(3hr/wk)
Total Credits Semester 2			52			
Year 3 total credits			128			
TOTAL CREDITS FOR THE PROGRAMME			395			

MODULE DESCRIPTORS

FIRST YEAR

U3583AL ACADEMIC LITERACY I

Module Title: ACADEMIC LITERACY IB
Module Code U3583AL
NQF Level 5
Notional Hours 80
NQF Credits 8
Prerequisite None

Contact Hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Compulsory/Elective	Compulsory
Semester Offered	0,1&2

Module Content
The module will cover study skills, reading, listening, speaking and writing, referencing, language usage and text organisation.

Student assessment strategies
Assessment will be based on Continuous Assessment.

U3403FS SKILLS PORTFOLIO

Module Title:	SKILLS PORTFOLIO
Module Code	U3403FS
NQF Level	N/A
Notional Hours	N/A
Contact hours	N/A
Additional learning requirements	None
NQF Credits	NCB
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester, Semesters 1 & 2

Module Content
UNIT 1: Academic Planning and Goal Setting
Individual Needs and Values; Steps in Reaching a Personal Vision; Proactive Approach Towards Learning; Self-Regulated Learning; Personal and Academic Goal Setting; Receptiveness to Learning; Exploring Self-Development and Self-Awareness.
UNIT 2: Attitude and Motivation
Understanding Motivation; Personal Attitudes, Behaviors and Interests; Self-Reflective Process; Approaches to Dealing with Negative Factors; Class Attendance and Participation; Procrastination; Self-Reliance; Discipline; Accountability; Healthy Habits.
UNIT 3: Learning styles
Understanding Personal Approaches to Learning; Dynamics of The Learning Process; Learning Styles and Strategies.
UNIT 4: Study Methods and Skills
Study Habits and Strategies; Learning Styles and Techniques; Effective Study Methods and Skills; Note Taking; Memory and Reading Skills; Critical Thinking.
UNIT 5: Time Management
Effective Time Management; Planning; Decision-making; Prioritization; Setting Boundaries; Time for Self –care; Procrastination.
UNIT 6: Assessment Preparation
In-class exercise; Test and Examination preparation; Organizing academic workload; Setting daily study goals; Staying physically active; Study groups.
UNIT 7: Mental well-being
Understanding mental health; Signs and indicators of poor mental health; commonly experienced mental health challenges; psychosocial stressors; Seeking professional help; Coping strategies.
UNIT 8: Interpersonal Communication
Effective Communication Skills; Verbal and Non-Verbal Communication; Listening Skills; Problem Solving; Assertiveness; Negotiation Skills; Practicing Empathy in Communication; Self-Confidence; Receptiveness to Feedback; Building Trust; Teamwork; Leadership; Public Speaking Skills.
UNIT 9: Financial matters and management
Financial Literacy; Budgeting; Available Finance Options and Assistance; Managing Financial Resources.
UNIT 10: Student Violence
Types of Violence; Individual Roles in Violence; Myths, Forms; Consequences of Violence; Prevention Measures; Seeking for Help.
UNIT 11: Career Planning and Development
Defining and Selecting Career Goals; Career Exploring Different Strategies; Soft Skills Training.

Student Assessment Strategies
100% continuous assessment
Reflective journal on each unit (portfolio)
Learning and Teaching Enhancement Strategies
- Student-lecturer evaluations conducted twice a year
- Moderation of assessment tools

U3583DD DIGITAL LITERACY

Module Title:	DIGITAL LITERACY
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact Hours	Semester 0: 4 hours /week; Semester 1: 2 hours/week Semester 2: 2 hours/week
Additional learning requirements	None
NQF Credits	8
Prerequisite (Co-requisites)	None

Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content
Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites
Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time
Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues
Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia
Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings
Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks
Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog)
Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Student Assessment Strategies
1. Collaborative assessment tasks
1.1 Digital productivity: cloud-based collaborative digital media creation using cloud platforms
1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing
2. Individual assessment tasks
2.1 Assignment: information literacy assignment
2.2 Test x 2
3. Practical
3.1 Digital proficiency
3.2 Data and Media literacy
No written examination

F3500ZI ISSUES IN AGRICULTURE

Module Title:	ISSUES IN AGRICULTURE
Module Code	F3500ZI
NQF Level	5
Notional Hours	40
Contact hours	20 Contact hours
Additional learning requirements	Field trips, Seminars, and quest lectures
NQF Credits	4
Prerequisite (Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module content
Agriculture: Agriculture as an important economic sector; Population dependence on agriculture for their livelihoods. Production systems: Production systems and production sustainability. Land tenure systems: freehold and customary tenure. Agricultural Opportunities and Restrictions: such as the veterinary cordon fence; financial collateral; and the greed in the commons. The Namibian market-driven economy and agricultural contribution: Agricultural practices; Resilience of livelihoods to withstand challenges posed by climate change; land scarcity, water; drought management relation to climate change; Cause and consequences of the supply chain of agricultural sub-sectors. Overview of sub-sectors and their value chains: cattle; sheep and goats; pigs; dairy; poultry; agronomy; horticulture; game and bio-mass. Niche markets: such as Swakara and Ethical issues of Genetically Modified Organisms (GMO's) and implications to food production systems; use of examples to demonstrate how a society use results into different externalities to balance policy intervention.

Student Assessment strategies
- Continuous assessment (100% of the final mark) consisting of a combination (or subset) of tests and quizzes (at least 3 hours in total), assignments, and practical reports (at least 4 gradable items).
- A final mark of 50% is required to pass this course

F3520ZP BASIC PROGRAMMING WITH PYTHON

Module Title:	BASIC PROGRAMMING WITH PYTHON
Module Code	F3520ZP
NQF Level	5
Notional Hours	20
Contact hours	One practical session every week for the duration of CS1
Additional learning requirements	None

NQF Credits	4
Prerequisite (Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	CS

Module Content
Python installation; Anaconda. Data Structures and their operations; Variables; Strings; numeric variables; Lists. Control Flow; if, else and elif statements. Functions; How to use basic functions; Numpy Arrays. Pandas; Series; DataFrames. Interaction with OS; Reading and Writing files. Data Visualization; histograms; line and scatter plots.

Student Assessment Strategies
- Student assessment will be based on formative assessment only through 100% continuous assessment.
- The assessment comprises 1 programming assignment.
- A minimum mark of 50% is required to pass the module.

F3511AB	INTRODUCTION TO BIOCHEMISTRY
Module Title:	INTRODUCTION TO BIOCHEMISTRY
Module Code	F3511AB
NQF Level	5
Notional Hours	140
Contact Hours	4 Lecture hours per week per semester; 3 Practical hours per week per semester
Additional learning requirements	None
NQF Credits	14
Prerequisite (Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
The scientific method and basic methods in Biology and Biochemistry:
Microscopy, scientific drawings, scientific method and writing of scientific reports.
Biological foundation: Taxonomy and binomial nomenclature; Overview of the five major kingdoms of organisms and viruses; Overview of Phylum Chordata; Introduction to cellular respiration and photosynthesis; Chemical basis of life, Introduction to the structure of macromolecules or biomolecules.
Cellular foundation: Cells as functional units of living organisms; prokaryotic and eukaryotic cells; ultra-structure of plant and animal cells, membrane structure and function, cell communication; cell cycle and cell death; cell division – mitosis and meiosis; molecular organization of genomes (prokaryotic and eukaryotic); source of energy and biosynthetic precursors.
Chemical foundation: Atomic structure and the Periodic table; Electron configuration; Average Atomic Mass. The Mole Concept; Lewis structures; Introduction to organic chemistry: organic compounds.
Biochemistry foundation: Acids, bases, buffers, pH, ionic strength, molarity; water (structure and ionization); Functional groups; Classes of hydrocarbons: alkanes, cycloalkanes: alkanes; alkenes and alkynes.
Genetics foundation: DNA as the genetic material, genes and chromosomes, genomes, Mendelian genetics - monohybrid and dihybrid crosses, Aneuploidy and non-disjunction, genotypes and phenotypes, introduction to extensions of mendelian analysis, chromosome theory of inheritance, mutations, Introduction to linked genes and sex linkages.

Student Assessment Strategies
- Continuous Assessments (2 tests, at least 3 marked practicals, quizzes / Assignments): 50%; Examination: 50% (1 x 3-hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3511CP	SOIL SCIENCE
Module Title:	SOIL SCIENCE
Module Code	F3511CP
NQF Level	5
Notional Hours	140
Contact hours	4 lecture hours per week per semester; 3 Practical hours per week per semester
Additional learning requirements	Field trips/excursions to areas with different soil formations in Namibia
NQF Credits	14
Prerequisite (Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
General physical properties of soils: Weathering and soil formation; The soil profile; Soil phases; Volume and mass relationships of soil constituents; Soil texture; Soil mineralogy; Soil structure. Soil water content and potential: Properties of bulk water; Properties of water at air and solid interface; Soil water content and its measurement; Soil water potential and its measurement; The soil water retention curve. Solute transport in soils: Conservation and flux equations; Conservation equation; Transport processes; Advection; Diffusion; Hydrodynamic dispersion. Soil Water Relations: Field water balance; Managing the soil water balance; Plant Water Relations: plant available water; the mechanism of water movement in the soil-plant-atmosphere continuum; water stress and plant adaptation; measurement of plant water stress. Common soil classification system: USDA (soil taxonomy); FAO classification systems. Inorganic and organic fertilizers: formulation; analysis; calculations and application methods.
Student Assessment Strategies

- Continuous assessment (at least 2 tests; 3 practicals and 2 assignments) 50% Examination 50% (1x3 hour Examination paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3531CA	MATHEMATICS FOR AGRICULTURE
Module Title:	MATHEMATICS FOR AGRICULTURE
Module Code	F3531CA
NQF Level	5
Notional Hours	120
Contact hours	4 Lecture hours per week per semester; 4 Tutorial hours per week per semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content

Ratios and Proportions: Share a given quantity in a specified ratio and use proportion to scale down or scale up quantities given a specific rate. Mathematics applications in agriculture: Calculation of various fertilizer contents; application rates; conversions in foreign markets; areas and volumes of various shapes; figures and Interest rates calculations Sets: Definition of a set; notation; equality of sets; subsets; characterization of equality via the subset relation; empty set; Venn diagrams; intersection; union; complement; proofs of simple results on set equality. Standard examples of sets: natural numbers; integers; rationals; real numbers. Cardinality of sets (examples of finite; infinite; countable; uncountable sets). Matrix Algebra: Matrices and vectors; principle of matrix multiplication; determinants; minors; cofactors and; transpose matrix; the cofactor matrix; adjoint and inverse; Cramer's rule; Solution of systems of equation; Gauss-Jordan elimination. Functions: Definition of function; Linear and non-linear function; selected nonlinear functions (exponents; and logarithms) and application in the biological field. Calculus: Differentiation and Integration of basic functions. Optimization: Review of inequalities; Linear; constrained and non-constrained problems: Review of series: Binomial and Geometric; factorial and summations notations.

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Student Assessment Strategies

- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination 50% (1 x 3-hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3501CW	BASIC WEED SCIENCE
Module Title:	BASIC WEED SCIENCE
Module Code	F3501CW
NQF Level	5
Notional Hours	60
Contact Hours	2 Lectures hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	Compulsory field trips/excursions (outside the normal practicals)
NQF Credits	7
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory.
Semester Offered	Semester 1

Module Content

This course discusses the history of weed science. Characteristics and effects of weeds. Weed identification and classification. Weed biology and ecology: propagation, growth, seed dormancy. Weed-crop competition: allelopathy, interference. Weed control practices: preventive, mechanical, biological, cultural, chemical, and integrated weed management. Herbicides: effect on plants, selectivity, fate in soil, application and safety, regulation, environmental impact. Herbicide resistance. The laboratories will emphasize grass and broadleaf weed identification, sprayer calibration and equipment, herbicide symptomology, pesticide labels, formulations, and safety, and integrated weed management programs for the major agronomic and horticultural crops

Student Assessment Strategies

- Continuous assessment (at least 2 tests; 3 practicals and 1 assignment) 50% and Examination 50% (1 x 2-hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3521CG	PRINCIPLES OF AGRONOMY
Module Title:	PRINCIPLES OF AGRONOMY
Module Code	F3521CG
NQF Level	5
Notional Hours	70
Contact Hours	2 Lecture hours per week per semester; 3 Practicals hours per alternate week per semester
Additional learning requirements	Field Trips, Excursions, Term Project
NQF Credits	7
Prerequisite (Co-requisites)	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Environmental factors affecting crop choice: Temperature; rainfall; solar radiation; photoperiodism. Time of planting: Pre- and post-rain planting. Land preparation: Aims; Tillage systems – conventional, minimum, conservation tillage; Cultivation equipment. Seeding: Factors affecting seed quality; Seeding depth; Seeding rate. Optimization of plant population: Plant spacing; row spacing, and field planting patterns; plant population density. Fertilizers: Fertilizer types; calculation; application times and application methods. Calculation of row and intra-row spacing. Cropping systems: Monoculture; Mixed culture; Intercropping; Production potential and mechanism, and yield advantage. Sustainable agriculture and resource use efficiency: Principle of Sustainability; Concepts of Sustainable Agricultural Production. Climate resilient agriculture and Crop diversification. Organic farming: Nutrient recycling; organic residues; organic manures; composting; soil biota and decomposition of organic residues; earthworms and vermicomposting; green manures and bio-fertilizers (Kelp). Precision agriculture: Smart agricultural technologies and tools. Crop environment in Namibia.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3512CI INTRODUCTION TO STATISTICS

Module Title:	INTRODUCTION TO STATISTICS
Module Code	F3512CI
NQF Level	5
Notional Hours	120
Contact hours	4 Lecture hours per week per semester 1-hour tutorial session per week per semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Introduction to statistics: Basic definition; the role of statistics; branches of statistics – descriptive and inferential; basic statistical notations and symbols. Data types: Categorical versus discrete and Continuous versus numerical; Data sources: Primary versus secondary; Types of measurements: Nominal, ordinal, interval and ratio scales; Collection and presentation of data: Tabular forms; frequency tables, cross-tabulations (two variables), Graphical methods; bar charts, histogram, pie charts, frequency polygons, stem-and-leaf plots, box and whiskers plot, ogives; Identifying outliers; Measures of central tendency (grouped and ungrouped data case): Mean, median, mode, quartiles; Measures of dispersion: Skewness, measures of skewness and kurtosis; variance, standard deviation, range, inter-quartile range, coefficient of variation. Basic Set theory: Definitions, Venn diagrams, Distributive Law, De Morgan's Law; Counting techniques: permutation and combination; Probability: definition using relative frequency, properties; axioms of probability, random experiments, sample space and events, addition rule, mutually exclusive events, conditional probability, total probability, Bayes Theorem and independence; Random variables: expectations, random vectors, functions of random variables and probability density in discrete and continuous case; Probability distributions: Bernoulli; Binomial; Poisson; Geometric; Uniform; Normal, Binomial and Normal tables, Point estimation and confidence interval: CI for the population mean and the difference between two means for both large and small sample size case. Hypothesis testing: Formulation of Single population mean, paired and independent samples for both small and large sample cases. Regression and correlation: Definitions, uses SLR model assumptions, OLS technique, and model validation. Correlation analysis, scatter diagrams, Pearson's correlation coefficient, Spearman's rank correlation and the coefficient of determination.

Student Assessment Strategies
- Continuous assessment (at least 2 tests, 2 tutorial tests and 2 assignments) 50%; Examination 50% (1 x 3-hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3532CL AGRO-CLIMATOLOGY

Module Title:	AGRO-CLIMATOLOGY
Module Code	F3532CL
NQF Level	5
Notional Hours	140
Contact Hours	4 Lecture hours per week per semester; 3 Practical hours per week per semester
Additional learning requirements	Field visits and Excursions to relevant institutions for exposure, field attachment and group projects on campus.
NQF Credits	14
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:
Introduction to basic agro-climatology concepts: weather, climate, meteorology, climatology, and climate elements; Relations between climate and agriculture with reference to crops, livestock, pests and diseases; Controls of weather and climate. Climate classifications: Köppen's classification, numerical realization; Climatic diagrams by Walter and Lieth; Climate variability and change. Fundamental processes: Solar energy; Atmospheric pressure; Relative humidity; Wind; Global climates; Regional and Namibian climates and climatic zones. General circulation of the atmosphere: Major pressure and wind belts; Extra-tropical and tropical cyclones; Monsoons. Climatic factors: The effects of latitude, altitude, topography, distance from oceans and lakes, and atmospheric circulation on local rainfall. Causes of seasons: Seasonal changes in the distribution of

solar energy (Equinoxes, Summer Solstice and Winter Solstice). Application of climatic data to agriculture: Concepts of climate-based modelling; weather forecasting and decision support tools. Dryland agriculture: Rainfed crop production (Cropping season duration, onset and cessation; dry spells; fundamentals of cropping systems and crop diversification); irrigation application for sustainable crop production.

Student Assessment and contributions
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3502AM	PRINCIPLES OF MICROBIOLOGY
Module Title:	PRINCIPLES OF MICROBIOLOGY
Module Code	F3502AM
NQF Level	5
Notional Hours	80
Contact hours	2 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites) Prerequisite	Foundations to Biology and Biochemistry
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Overview of Microbiology: Branches and history of microbiology; classification of microorganisms; microbial environments and interrelationships. Overview of Bacteria: Bacterial size, shape and arrangements; bacterial culture, media and streaking; microscopy and staining; control of microbial growth; chlamydia and rickettsia. Overview of Eukaryotic Organisms: General characteristics of algae, fungi and protozoa. Introduction to Virology: Salient features; bacteriophages. Role of microbes in soil, food and industry: microbes and bacterial use in various industries. Important pathogens of animals. Other topics: Preparation of media; culture of bacteria; staining and microscopic examination of bacterial cells; antibiotic sensitivity testing.

Student Assessment Strategies
- Continuous assessment (2 tests, at least 4 assessed practicals and 2 assignments and ad-hoc quizzes/tasks) 50%; and an Examination 50% (1x 3 hours theory paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3502CN	PLANT GENETICS
Module Title:	PLANT GENETICS
Module Code	F3502CN
NQF Level	5
Notional Hours	70
Contact Hours	02 Lecture hours/week per semester 03 Practical hours / alternate week per semester
Additional learning requirements	Field trips/excursions and group work
NQF Credits	7
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Mendelian genetics: Phenotype, Genotype, Segregation, Independent Assortment, Allelic and gene interactions: Dominance, co-Dominance, Pleiotropy, Epistasis. DNA Structure/Biochemistry and Function and its packaging: Genes and their molecular structures. Transcription, Translation and Protein Synthesis: (Introns and Exons) and The Genetic Code. Chromosomal Behaviour. Basics in Heredity; Karyotypes and Variation. The Cell Cycle; Mitosis, Meiosis, Crossing Over. Gene Regulation: Molecular Mechanism and gene regulation of Prokaryotic organisms and Eukaryotic plants, Promoters, Enhancers, Regulatory Proteins, and Transposable Elements. Genetic Mapping: Gene Linkages, Sex linkage; Sex-limited and Sex-influenced, Examples of Sex-Linked Genes. Introduction to Plant Genomics and their importance in evolution. Introduction of Genetic Engineering: Essential techniques in plant genetic engineering; DNA Extraction, The Polymerase Chain Reaction (PCR), Gel Electrophoresis, Plant DNA Sequencing, Plant DNA Cloning, and Recombinant DNA Technology. Types and Mechanisms of Mutations and Induced Mutations. Introduction to Quantitative and Qualitative Genetics: Polygenic inheritance, Analysis of polygenic traits, Genetic improvement of crop plants including heritability, the role of environment, pedigree selection, recurrent selection, and the backcross method. Basics of Population Genetics with special emphasis on the Hardy –Weinberg Law.

Student Assessment Strategies
- Continuous Assessment: (at least 2 tests, 1 assignment, 7 practicals): 50%; Examination: 50% (1 x 3 hours paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3522CS	PLANT SCIENCE
Module Title:	PLANT SCIENCE
Module Code	F3522CS
NQF Level	5
Notional Hours	70

Contact Hours	3 Lecture hours per week per semester; 3 Practicals hours per alternate week per semester
Additional learning requirements	Field visits and Excursions to relevant farms for exposure, field attachment and group projects on campus and Term Projects.
NQF Credits	7
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Naming and classifying plants: Taxonomy and biosystematics; Plant identification and nomenclature; Identification keys; Climatic and related classifications; Agriculturally important plant families; Origin, domestication and improvement of cultivated plants; Basic genetic concepts in plant improvement; Introduction to Biotechnology. Structure of higher plants: Cell structure, plant tissues; The morphology and anatomy of roots, stem, leaves, flowers, fruits and seeds. Photosynthesis: Chemistry, energy requirements and pathways (C3, C4 & CAM); Photorespiration. Plant Respiration: Factors affecting rates of respiration, Glycolysis, Tricarboxylic Acid Cycle, Oxidative phosphorylation. Plant growth and Development: Shoot and root growth patterns; Flowering - photoperiodism, thermoperiodism and the control of flowering in plants, growing degree-day; Fruiting - pollination, fertilization, double fertilization, parthenocarpy, fruit setting, growth and development; Plant growth regulators; Secondary metabolites. Propagation of Plants: Sexual and vegetative propagation; Tissue culture. Plant Water Relations: Importance; water uptake; water potential; transpiration. Nutrient uptake and transport: Passive and active transport; Phloem translocation.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

SECOND YEAR

F3611CK CROP ECOPHYSIOLOGY

Module Title:	CROP ECOPHYSIOLOGY
Module Code	F3611CK
NQF Level	6
Notional Hours	160
Contact Hours	2 Lecture hours per week per semester; 3 practicals hours an alternate week per semester
Additional learning requirements	Field visits and Excursions to relevant farms for exposure, field attachment and group projects on campus and Term Projects.
NQF Credits	16
(Co-requisites) Prerequisite	Plant Science, Principles of Agronomy
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Carbon fixation by crop canopies: Essential factors for photosynthesis; amount and quality of light; light penetration into crop canopy; leaf area and interception of solar radiation; Crop growth rate, leaf area index, net assimilation rate; strategies for maximizing solar energy utilization; leaf area duration, plant density and yield. Transport and partitioning of assimilate: Phloem transport; Harvest index; Yield components. Growth and development: Factors affecting growth and development; Growth dynamics; Growth analysis; Seed development, germination and dormancy; factors affecting root growth and distribution, root plasticity; factors affecting leaf and stem growth and branching; vegetative regrowth; maturation and ripening; senescence and abscission. Symbiotic relationship in plants: Mutualism (Biological Nitrogen fixation, mycorrhizal associations); Competition (Indices of plant competition). Plant responses to environmental stress: Plant water relations, evapotranspiration, moisture stress and water use efficiency; responses to environmental stress (Temperature, drought, salinity, flooding, ionic toxicity, radiation, anthropogenic, herbivory); stress tolerance mechanisms of Crops in Arid and Semi-Arid Conditions.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3631CC FIELD CROP PRODUCTION

Module Title:	FIELD CROP PRODUCTION
Module Code	F3631CC
NQF Level	6
Notional Hours	160
Contact Hours	4 Lecture hours per week per semester; 3 Practicals hours per week per semester
Additional learning requirements	Field Trips, Term Project
NQF Credits	16
(Co-requisites) Prerequisite	Principles of Agronomy
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
Production of major field crops in Namibia: Importance to the economy; soil, climatic and cultural requirements; improved varieties; handling and processing of Cereals crops (pearl millet, maize, wheat, sorghum, rice, wheat, barley); Oilseed crops (sunflower, soybean, groundnut, caster bean); Grain legumes (cowpea, Bambara groundnut, kidney beans, groundnut, soya beans), Fiber crops (cotton, sisal); Root and tuber crops (sweet potatoes, cassava, Irish potatoes) and Fodder and forage crops (Lucerne, forage grasses).

Student Assessment Strategies
- Continuous Assessment (minimum of 2 tests, 1 assignment, 7 practicals and Term Project): 50%; Examination: 50% (1 x 3 hours paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3552CM	PLANT PROPAGATION AND NURSERY MANAGEMENT
Module Title:	PLANT PROPAGATION AND NURSERY MANAGEMENT
Module Code	F3552CM
NQF Level	5
Notional Hours	80
Contact Hours	4 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure) and group projects on campus.
NQF Credits	8
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Types of plant propagation: sexual and asexual. Propagation techniques for fruit species: seed propagation; genetic segregation and disadvantages of fruit and ornamental plant propagation by seed; uniformity; consistent quality. Vegetative propagation: stem cuttings; air layering; grafting; budding; in vitro culture plantlets. Factors influencing rooting of cutting and layering: physiological condition of the mother plant; Juvenility; type of the wood; the presence of leaves and buds; the presence of viruses; the position of the basal cut in the cutting; season; treatment of cuttings and environmental conditions. Graft incompatibility: anatomical; studies of graft/bud union and scion-stock relationship and their influences. Seed Dormancy: causes (internal and external factors) and methods of breaking dormancy. Apomixis: advantage of apomixis over sexual reproduction. Techniques of propagation through specialized organs: corms; runners and suckers. Soil and climatic requirements: establishment; management practices. Nursery practices: environmental factors affecting nursery management; soil sterilization; pot-filling; preparation of nursery beds and sowing of seeds; irrigation; hardening; hygiene and transplanting. Main tropical and subtropical fruit species: propagation; cultivation; harvest and handling. Indigenous fruit species: propagation and adaptation challenges. Propagation of stimulants: coffee; tea; cocoa. Pollination requirements for some fruit tree species: the importance of bees; establishment and maintenance of bee colonies. Propagation of ornamental and landscape plants: most common indoor and outdoor ornamental species. Growth regulators: uses in fruit and ornamental plant propagation. Plant micro-propagation: Tissue and cell cultures. Good agricultural practices (GAP) scouting; hygiene; record keeping; pollution management.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3601CY	PRINCIPLES OF PLANT BREEDING
Module Title:	PRINCIPLES OF PLANT BREEDING
Module Code	F3601CY
NQF Level	6
Notional Hours	160
Contact Hours	4 hours of contact lecture per week; 3 hours practical session every two weeks for one semester.
Additional learning requirements	Field trips/excursions and group work
NQF Credits	16
(Co-requisites)/Prerequisite	Plant Genetics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
Aims of plant breeding: Yield improvement, yield stability, biotic and abiotic stress tolerance and resistance, and nutritional quality. Plant breeding strategies: Important traits for adaptation, yield and quality of crops, techniques to evaluate genetic potential of superior traits, sources of desired traits, means to combine desired traits into an improved variety. Plant genetic resources: Importance of genetic diversity, centres of diversity, wild relatives, ex-situ and in situ gene banks, CGIAR plant conservation and improvement system, and germplasm collection, evaluation, documentation, utilization and conservation methods. Breeding for quality traits: Breeding for yield, nutritional quality, tolerance to environmental stresses, and resistance to insects and diseases. Selection methods: mass, backcrossing, single seed descent, pure line, pedigree and recurrent selection, clonally propagated crops, hybrid cultivars (hybrid vigour and inbreeding depression). Plant reproduction mechanisms: Inbreeding mechanisms – cleistogamy, flower closure, etc; out-breeding mechanisms-dioecy, monoecy, male sterility, incompatibility, sex separation in time; Common conventional breeding procedures for inbreeding and outbreeding

crops. Overview of novel breeding techniques: Mutagenesis, haploid and polyploidy plants, somaclonal variation, marker-assisted selection and Recombinant DNA technology. Technologies for linking genes to traits: Molecular markers, mapping of genes. Varietal release process in plant breeding: Genotype x environment interactions, stability analysis models, adaptation, designing field trials and evaluation, release standards and the naming of a new variety.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 5 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3612TE	AGRICULTURAL ENGINEERING
Module Title:	AGRICULTURAL ENGINEERING
Module Code	F3612TE
NQF Level	6
Notional Hours	160
Contact hours	4 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure), field attachment and group projects on campus.
NQF Credits	16
(Co-requisites) Prerequisite	Agricultural Mathematics
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Fundamentals of Engineering: Fundamental quantities and units; Concepts of work; Power and Torque. Farm Power sources: Animal Power; electricity; Natural Power wind energy; solar energy. Animal Power: Hitching; Capability; Training. Machine Power: The tractor; Internal combustion engine and other sub-systems; Power trains; Tractor tests and performance; Operation and maintenance; Safety. Tillage: Primary tillage; secondary tillage; conservation tillage; implement types and their operation. Crop planting, fertilization and weed control: Equipment types and operation; calibration and safety aspects. Crop Harvesting: Objective, equipment types, operation, and maintenance; combine harvester types and operation. Farm Machinery Management: Machine capacity, performance, and costs; Machinery cost and selection. Post-Harvest Handling, Storage and Processing: Structures; equipment, operation, and maintenance. Farm Structures: phases of structural engineering; types of agricultural structures; crop housing, building components and functions; maintenance of structures. Workshop safety and technology: equipment and tools, Soil and water erosion: processes and conservation methods. Irrigation and drainage; types; selection, plant soil water relationship; irrigation system operation and maintenance. Drone technology: Basic operational principle; application of drone technology in agriculture; maintenance.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3612CD	SOIL FERTILITY AND PLANT NUTRITION
Module Title:	SOIL FERTILITY AND PLANT NUTRITION
Module Code	F3612CD
NQF Level	6
Notional Hours	160
Contact hours	4 Lecture hours/week/semester 3 Practical hours/week/semester
Additional learning requirements	Field trips/excursions (outside the normal practicals); to fertilizers-related industries.
NQF Credits	16
(Co-requisites) Prerequisite	Soil Science
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Soil organic matter: Carbon cycle; CO2; global warming; bioassay, response to management practices. Plant nutrients: macronutrients; micronutrients; Functions of each nutrient in plant metabolism and growth. Basic soil chemistry concepts: soil pH and nutrient availability; soil colloids and cation exchange. Solubility equilibria as applied to nutrient and solubility and movement. Mobility of major nutrients in the soil and the plant. Salinity: meaning measurement and amendment. Soil acidity and alkalinity and amendment: liming requirements. Fertilizers: nutrients content; solubility; fertilizer formulations; losses; types of fertilizers—single fertilizers; compound fertilizers; Law of the minimum. Soil and plant analysis. Integrated nutrient management. A brief overview of nutrient deficiency symptoms.

Student Assessment Strategies
- Continuous Assessment (minimum of 2 tests, 1 assignment, 7 practicals): 50%; Examination: 50% (1 x 3 hours paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3632EE	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Title:	AGRICULTURAL EXTENSION AND GROUP DYNAMICS
Module Code	F3632EE
NQF Level	6

Notional Hours	140
Contact hours	4 Lecture hours per week per semester
Additional learning requirements	Group work
NQF Credits	14
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Extension concepts: Principles, principles and philosophies; compare Modern and Traditional Extension; introduction of the new extensionist. Trends in the extension sector: The focus on globalisation and pluralism; adult learning for behavioural change. Extension methods: group contact, individual and mass contact. ICT innovation: to emerging agricultural challenges faced by extensionists. Extension Approaches: Identifying and comparing agricultural extension approaches. Perception: theatrical background of farmers, attitudes and decision-making. Programme Extension: understanding of leadership principles and leadership development in community-run initiatives. Social change and innovation: attributes of Innovations and their rate of adoption. Models of communication: process; written communication news reporting articles and newsletters; setting up communication public speaking; non-verbal communication: Interpersonal communication and needs: definition and importance of group; the group as a channel of communication; group formation and functioning; group techniques. Group norms and cohesion: group goals; group members' roles; behaviour and attitude in a group; motivation of the group.

Student Assessment Strategies
- Continuous (minimum 2 Tests (50%), Term Assignments (30%) Quizzes and tutorials (20%): 50%; Examination 50% (1 x 3-hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3602CJ PREPARATION FOR CROP PRODUCTION PROJECT

Module Title:	PREPARATION FOR CROP PRODUCTION PROJECT
Module Code	F3602CJ
NQF Level	6
Notional Hours	80
Contact hours	4 Lecture hours per week per semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content
Establishment of a comprehensive crop production plan. Crop choice: Cultivar availability; adaptability and profitability of specific crops. Production activities: Land preparation; crop management; harvesting; post-harvest processing (value addition).
Materials Resource planning procedures (MRP): List all requirements for the next production cycle; source the materials; Production activity planning including critical path analysis.
Budgeting and procurement: Production inputs of seeds, fertilizers, pesticides, labour, packaging materials; transport; etc. Presentation of the production plan.

Student Assessment Strategies
- Written enterprise cropping program: 50%; oral presentation of the enterprise cropping program: 50%.
- To pass this module a student must obtain a minimum final mark of 50%.

THIRD YEAR

W3700CZ FIELD ATTACHMENT FOR CROP SCIENCE

Module Title:	FIELD ATTACHMENT FOR CROP SCIENCE
Module Code	W3700CZ
NQF Level	7
Notional Hours	240
Contact hours	6 Practical hours per day x 5 days per week for 4-6 months
NQF Credits	24
Additional Learning Requirements	None
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core semester

Module Content
This module is based on Work Integrated Learning (WIL). Students taking this module will be working in a farm environment in the crop production industry. During the field attachment, students will work as trainees under farm/company supervision and will undertake at least two months of attachment at an appropriate venture for hands-on practical training. Students will maintain a logbook of daily activities and will be required to submit a comprehensive final report for assessment at the beginning of the following semester. Students will be visited at their workplaces by their Lecturers at least once during the attachment period.

Assessment Strategies

- Continuous Assessment: 100% (Daily Logbook Record 20%, Lecturer/Employer Evaluation 20%, and Seminar Presentations and Oral Presentation of Final Report 50%).
- The student will be awarded a pass or fail status, depending on performance.

F3701CU	CROP PRODUCTION PROJECT
Module Title:	CROP PRODUCTION PROJECT
Module Code	F3701CU
NQF Level	7
Notional Hours	90
Contact hours	5 Practical hours/week/semester
Additional learning requirements	Preparation for Crop Production Project
NQF Credits	9
(Co-requisites) Prerequisite	Preparation for Crop Production Project
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content

This is a Work Integrated Learning (WIL) module, running for 4-6 months. Students taking this module will be working in a farming environment at Ogongo Farm or any other UNAM farm where they will be expected to use library resources; conduct literature reading; plan; produce; process, grade package, and market crops under minimum supervision, under at least one academic mentor. In the production process, the following aspects will be carried out: Crop husbandry: Principles of sustainability; production profitability; "Good Agricultural Practices (GAP); Climate-Smart Agriculture (CSA) and Environmental Impact Assessment (EIA)".Irrigation Technology: Design; operate and maintain. Farm management practices: budgeting; record keeping; Cost concepts: Fixed; variable and opportunity cost; investment analysis; risk and uncertainty management; machinery management and human resource management (These to be practically executed)

Student Assessment Strategies

- Actual field practice: 50%; Production progress reports (minimum of 3 reports): 50%.
- To pass this module a student must obtain a minimum final mark of 50%.

F3721CH	INTEGRATED CROP PROTECTION
Module Title:	INTEGRATED CROP PROTECTION
Module Code	F3721CH
NQF Level	7
Notional Hours	90
Contact hours	4 Lectures hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	Compulsory field trips/excursions (outside the normal practicals);
NQF Credits	10
(Co-requisites)/Prerequisite	Basic Weed Science
Compulsory/Elective	Compulsory.
Semester Offered	Semester 1

Module Content

Protection of plants from pest infestation and disease infection: importance, biomorphology, and ecology of plant pests; importance and concept of plant disease; classification of plant disease; symptom and the damage caused by plant pathogens; parasitism and disease development; the causal agents of plants disease; plant defense against infection plant disease. Plant disease epidemiology: the factors involved; principles of plant and disease management; and integrated pest management concept. Safe handling and use of agricultural chemicals: the maximum use of all economic resources as they relate to agricultural pest controls; the development of philosophies to protect the environment, and national laws regarding the use of pesticides.

Student Assessment Strategies

- Continuous assessment (minimum 2 tests and 1 assignment, 5practicals): 50%; Examination: 50% (1 x 3-hour paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F3711CV	VEGETABLE PRODUCTION
Module Title:	VEGETABLE PRODUCTION
Module Code	F3711CV
NQF Level	7
Notional Hours	180
Contact hours	4 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure), field attachment and group projects on campus.
NQF Credits	18
(Co-requisites)/Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Horticulture: branches of horticulture; types of horticultural production. Vegetable classification systems: botanical; pollination; growth season; optimum growth temperature; cold/heat sensitivity; edible plant part. Importance of vegetables: economic

and human nutrition importance. Cropping systems: shifting cultivation; continuous cropping; crop rotation; sole cropping and mixed cropping. Production requirements/ practices: environmental requirements; selection of suitable cultivars; vegetable nursery practices; management practices, seed dormancy. Crop protection: Different methods of weed; pest and disease control. Cultural practices: hardening/ acclimatization; mulching; thinning; pruning; training; earthing-up; phase planting. Plant growth regulators and their use in commercial horticulture: improvement of fruit set; modification of sex ratios; parthenogenesis. Good agricultural practices (GAP): scouting; hygiene; record keeping; pollution management; pre-harvest interval; field vegetable holding shed. Main vegetables: fruit; root; leaf; perennial and leguminous vegetables – their propagation; cultivation; harvest and handling. Indigenous vegetables: plant domestication and adaptation principles. Hydroponics: hydroponics principles and infrastructure. Mushroom production: cultivation technology of common mushroom species. Spices, medicinal and pharmaceutical plants: most common medicinal species – their propagation; cultivation and utilization. Harvesting of vegetable crops: properties of vegetable commodities; moisture content; shelf life; harvesting indicators; harvesting methods and post-harvest handling. Marketing: Good harvest and post-harvest practices; marketing strategy; selling channels; price and quality.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3712EE ENTREPRENEURSHIP

Module Title:	ENTREPRENEURSHIP
Module Code	F3712EE
NQF Level	7
Notional Hours	160
Contact hours	4 Online lectures and Reflective Practices per Week per semester
Additional learning requirements	None
NQF Credits	16
(Co-requisites) Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Content
This course introduces students to the theory of entrepreneurship and its step-by-step practical implementation. it focuses on the theory of entrepreneurship; its meaning, importance of entrepreneurship, concepts, characteristics, classifications of entrepreneurship, problems faced by entrepreneurs in Namibia, entrepreneurial process; critical factors for starting a new enterprise, evaluating opportunities for new businesses, determining resource needs and acquiring resources; business model; the revenue model, the cost model, formulating a winning strategy, the people are what matters- entry strategy- growth strategy; entrepreneurial marketing; marketing considerations- selecting the target market, market strategy. pricing strategies and marketing of services, export marketing; financing entrepreneurial ventures; sources of finance: debt and equity; entrepreneurial growth; transition from start-up to growth, the growth process and execution; intellectual property rights by understanding the mandates of BIPA; copyrights, trademarks, trade secrets, patents, licensing; business planning process under Namibian regulations; planning process, business plan; accounting for agri-business enterprises; basic financial statements, managing cash flows, preparation of projected financial statements, applications of business ratios, small business management as well as strategies that improve performance of new business ventures; production and material, human resources, finance management, break-even analysis, operational cycle.

Student Assessment Strategies
The student assessment will comprise Individual assignments, Tests, Quizzes, and Examinations.
- Exams: There will be a written final examination consisting of essay questions;
- Test: the students write tests to assess their understanding of teaching and learning materials;
- Quizzes: There will be short unannounced quizzes with questions will be related to the day's assigned reading and prior class sessions;
- Assignments: There will be several assignments for the student to apply the material from the lectures and t he readings. The expectation is that assignments be completed individually.

The grade in this course will be comprised of the following elements
- Continuous 50% (2 Tests (25%), assignments (15%);
- Examination 50% (3 hours);
- To pass this module a student should obtain a minimum final mark of 50%.

F3712CB BIOMETRY

Module Title:	BIOMETRY
Module Code	F3712CB
NQF Level	7
Notional Hours	160
Contact hours	4 Lecture hours per week per semester 2-hour tutorial sessions per semester
Additional learning requirements	None
NQF Credits	16
(Co-requisites)/Prerequisite	Introduction to Statistics
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content

Experimental design: Basic experimental terms; Principles of experimental design; Types of designs CRD; RCBD; Latin Square; Factorial; Split plot; Split-split plot and Repeated Measures designs; one-way and two-way ANOVA; assumptions and ANOVA model diagnostic checks. Parametric and non-parametric tests: comparison between parametric and non-parametric tests; Non-parametric test- Goodness of fit and test of association; paired and independent test in non-parametric; Kruskal-Wallis test; Friedman and Runs test. Multivariate Techniques: PCA; CA; Path Analysis; FA; Canonical Correspondence; multidimensional scaling and Genotype × environment Interaction Analysis. Response Surface Methodology: Central Composite designs and Box-Behnken designs. Multiple Linear Regression: MLR model; Analysis and building an MLR; testing the usefulness of the MLR model. Survey Methods: Sampling Frame; Modes of data collection; research designs; and questionnaire design and reliability analysis.

Student Assessment Strategies

- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper).
- To pass this module a student must obtain a minimum final mark of 50%.

F2502CY	PLANT BIOCHEMISTRY
Module Title:	PLANT BIOCHEMISTRY
Module Code	F2502CY
NQF Level	5
Notional Hours	70
Contact hours	2 Lecture hours per week per semester; 3 Practicals hours per Alternate week per semester
Additional learning requirements	Trips to associate Labs
NQF Credits	7
(Co-requisites)	
Prerequisite	Introduction to Biochemistry
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content

Plant cell structure: Composition and structure; Membrane transport system – pumps and ion channels. Light Reactions of Photosynthesis: Light absorption; Photosystem structure and function; Photosynthesis inhibitors (herbicides); C4 and CAM photosynthesis. Carbohydrates synthesis, transport and storage: Classification. Structures of Monosaccharides, Disaccharides and Polysaccharides. Starch biosynthesis; Starch degradation; Cellulose (synthesis and degradation). Respiration: Glycolysis; Tricarboxylic acid cycle/Citric acid cycle; Oxidative pentose phosphate pathway. Fat and lipid metabolism: Structures and properties of fatty acids; Fatty acid biosynthesis; synthesis of membrane lipids. The oil composition of seeds. The function of Cutin and suberin. Amino acids and Protein metabolism: Amino acids biosynthesis in plants; Seed storage proteins. Enzymes: General properties; Classification; Mechanism of action; Introduction to allosteric enzymes. Nitrogen and Sulfur metabolism: Ammonia assimilation; Sulfur chemistry and function, Sulfur uptake and transport. Biosynthesis of phytohormones: Gibberellins, Abscisic acid, Cytokinins, Auxins, Ethylene, Brassinosteroids, Polyamines, Jasmonic acid, Salicylic acid and Strigolactones. Secondary metabolites: Alkaloids (biosynthesis & biotechnological application); Terpenoids (biosynthesis, modification and metabolic engineering); Phenolics (Phenolic acids, coumarins, lignans, flavonoids, tannins, lignin). The Biochemistry of plant responses to stress: Water deficit; Flooding and oxygen deficit; Heat stress; Freezing and chilling effects; Induced defense against herbivory, pests and pathogens; systematic defense signalling.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 60% to the final mark while the summative assessment would contribute 40%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3752TI	SOIL CONVERSATION AND IRRIGATION TECHNOLOGY
Module Title:	SOIL CONVERSATION AND IRRIGATION TECHNOLOGY
Module Code	F3752TI
NQF Level	7
Notional Hours	180
Contact hours	4 Lecture hours per week per semester; 3 Practical hours per alternate week per semester
Additional learning requirements	Excursions (visits to relevant farms for exposure), field attachment and group projects on campus.
NQF Credits	18
	to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). To pass this module a student must obtain a minimum final mark of 50%.
(Co-requisites)	
Prerequisite	Principles of Soil Science
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Content

Water Resources Irrigation: Irrigation agronomy crop water requirements; irrigation water requirements. Planning an irrigation project: land evaluation; the theory and analytical methods in land evaluation; land use planning process; land classification;

topographic survey and planning soil conservation. Irrigation Engineering: choosing an irrigation method; principles of plant-soil-water relations; application of irrigation to the soil; irrigation scheduling. Operation and management of Irrigation systems: Surface irrigation; sprinkler irrigation; trickle/drip irrigation. Introduction to global issues in irrigation. Alternatives to irrigation: water harvesting. Soil management and reclamation on irrigated land: soil erosion; erosion types and processes; estimating soil losses (measurement and prediction); erosion control methods; Soil and water conservation principles and their importance to agricultural development: principles of conservation agriculture (CA); agronomic and mechanical erosion control methods (water and wind erosion). Sound soil and water management principles to maintain and enhance the productivity of agricultural lands: Purpose and emphasis on the environmental impact assessment process and land evaluation for a specific farm. Drainage of irrigated land. Drone technology: application on soil and field analysis for irrigation, fertilization, planting, checking nutrient levels, moisture concentrations, and erosion.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end-of-semester examination (1 x 3-hour paper). To pass this module a student must obtain a minimum final mark of 50%.

E.2.4.2 BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING (HONOURS) 31BHEA

ADMISSION REQUIREMENTS

To be admitted into the **Bachelor of Science in Agricultural Engineering Honours**. A candidate should have obtained the following grades at NSSCAS/NSSCO level or equivalence from a recognized qualification.

1. Subject to school specific regulation, the normal basic requirement for entrance to the **Bachelor of Science in Agricultural Engineering Honours** program shall be:

(a) 3 subjects (Mathematics, Physics and Chemistry) on NSSCAS level with an average grade of "c" in each subject or higher

(b) 2 subjects on NSSCO level with "C" average or higher, and

(c) English must be at minimum "C'' at NSSCO level.

2 For applicants with school leaving certificates obtained prior to 2021, the requirements of the UNAM admission, students recruitments and registration policy will apply:
Subject to school specific regulation, the normal basic requirement for entrance to the Bachelor of Science in Agricultural Engineering Honours program shall be a pass in 5 different subjects as follows:

(a) 2 subjects (Mathematics, Physical Science) on NSSCAS level with an average grade of "2" in each subject or higher

(b) 3 subjects on NSSCO level with "C" average or higher, and

(c) English must be at minimum "C'' at NSSCO level.

3. Alternative Pathways to Admission

3.1 Successful Completion of Pre-Engineering Program
Students who do not meet the minimum admission entry requirements into the Bachelor of Science in Mechanical Engineering can opt to enroll into the Pre-Engineering Program offered at the University of Namibia. A student from the Pre-Engineering program will be admitted in to the Bachelor of Science in Electrical Engineering if they meet the following requirements:

(a) A minimum average of 60% in all Chemistry support modules

(b) A minimum average of 60% in all Physics Support modules

(c) A minimum average of 60% in all Mathematics support modules

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	NQF credits	Contact Hrs / week (L / P / T)	**(Co-requisites)** / Pre-requisites	Compulsory (C) / Elective (E)
	Year 1 Core Semester					
TBC	Skills Portfolio	5	0	-	None	C
U3583AL	Academic Literacy I	5	8	2 L + 1T	None	C
I3500NI	Introduction to Mechanical Engineering	5	6	2 L + 1T	None	C
U3583DD	Digital Literacy	5	8	2 L + 1T	None	C
U3420CN	National and Global Citizenship	5	2		None	C
	Total credits Semester Core		24			
	Year 1 Semester 1					
I3511IM	Engineering Mathematics I	5	16	4 L + 1T	None	C
I3531ID	Engineering Drawing	5	16	4 L +1T and/or 1P	None	C
I3521NP	Physics for Engineers I	5	12	3 L + 1P	None	C
I3551CC	Computing Fundamentals	5	12	3 L + 1T and/or 1P	None	C
I3511NC	Chemistry for Engineers	5	16	4 L + 1P	None	C
	Total credits Semester 1		72			
	Year 1 Semester 2					
I3512IM	Engineering Mathematics II	5	12	3 L + 1 T	(I3511IM)	C
I3542NP	Physics for Engineers II	5	12	3 L + 1P	(I3521NP)	C
I3502EE	Fundamentals of Electrical Engineering	5	8	2 L + 1T and/or 1P	(I3511IM)	C
I3572IS	Materials Science	5	12	3 L + 1T and/or 1P	None	C
I3532NM	Engineering Mechanics I	5	12	3 L + 1T and/or 1P	(I3521NP)	C
I3552IS	Statistics for Engineers	5	12	3 L + 1T	(I3511IM)	C
	Total credits Semester 2		68			

	Total credits Year 1		164			
	Year 2 Core Semester					
U3683AL	Academic Literacy II	6	8	2 L + 1T	U3583AL	C
I3620IE	Engineering Entrepreneurship	6	8	2 L + 1T	None	C
I3640IW	Workshop Practice	6	8	3 P	None	C
	Total credits Semester Core		24			
	Year 2 Semester 1					
I3611IM	Engineering Mathematics III	6	16	4 L + 1 T	(I3512IM) I3511IM	C
I3601IE	Engineering Economics	6	8	2 L + 1 T	None	C
I3631IC	Computer Programming I	6	12	3 L + 1T and/or 1P	(I3551CC)	C
I3651VM	Strength of Materials I	6	12	3 L + 1T and/or 1P	(I3532NM)	C
I3642NM	Engineering Mechanics II	6	8	2 L + 1T and/or 1P	(I3532NM)	C
I3661NM	Engineering Materials	6	8	2 L + 1T and/or 1P	(I3572IS)	C
	Total credits Semester 1		64			
	Year 2 Semester 2					
I3612IM	Engineering Mathematics IV	6	16	4 L + 1T	I3512IM (I3611IM)	C
I3652CP	Computer Programming II	6	12	4 L + 1T and/or 1P	(I3631CP)	C
I3652EM	Electrical Machines I	6	12	4 L + 1T and/or 1P	(I3502EE)	C
I3632NF	Fluid Mechanics I	6	12	4 L + 1T and/or 1P	(I3532NM)	C
I3622ND	Mechanical Engineering Design I	6	8	2 L + 1T and/or 1P	I3532NM	C
I3622CM	Measurements and Instrumentation	6	8	2 L + 1T and/or 1P	(I3502EE)	C
	Total credits Semester 2		68			
	Total credits Year 2		156			
	Year 3 Core Semester					
F3710TA	Research Methods in Agricultural Engineering	7	12	3 L + 2 P	I3552IS	C
F3730TB	Hydraulics and Hydrology	7	12	3 L + 2 P	13642NM	C
	Total credits Core semester		24			
	Year 3 Semester 1					
F3751TC	Livestock and Crop	7	12	3 L + 2P	None	C
I3731NM	Control Systems	7	12	3L + 1T and/ or 1P	(I3622CM)	C
F3771TD	Farm Power, Machinery &	7	12	3 L + 2P	I3642NM	C
F3701TE	Irrigation Theory and Practice	7	8	2 L + 2P	None	C
	Total credits Semester 1		44			
	Year 3 Semester 2					
F3722TF	Soil Mechanics and Cultivation	7	8	2 L +2 P	None	C
F3712TG	Soil and Water Conservation	7	16	4 L + 3P	F3701TE	C
F3742TH	Project planning &	7	8	2L + 2P	I3601IE	C
F3732TI	Irrigation and Drainage Design Engineering	7	16	4 L + 3P	F3701TE	C
I3762NH	Heat Transfer	7	8	2 L + 1T and/or P	(I3521NP)	C
	Total credits Semester 2		56			
	Total credits Year 3		124			
	Year 4 Core Semester					
F3800TE	Engineering Ethics and Practice	8	8	2L + 2P	None	C
F3820TI	Industrial Attachment	8		Six (6) hours/ day for Six (6) wks.	None	C

TBC	Design thinking	8	8	2L + 2P	None	C
F3840TR	Research proposal	8	8	2L + 2P	F3710TA	C
	Total Credits Core Semester		24			
	Year 4 Semester 1					
F3821TE	Renewable Energy and	8	8	2L + 2P	I3502EE	C
F3811TS	Storage and processing of agricultural products	8	16	4 L + 3P	F3751TC	C
F3821TP	Research Project	8	16	16 hours of research work + seminar presentations +	All 3rd Year Modules	C
F3813TD	Agricultural Engineering Design Project	8	16	14 hours of research work + seminar presentations +	All 3rd Year Modules	C
	Total credits Semester 1		56			
	Year 4 Semester 2					
F3812TM	Farm Machinery and Implement Design	8	16	4 L + 3P	F3771TD	C
F3812TF	Farm Structures Planning and Design	8	16	4 L + 3P	I3651VM	C
F3821TP	Research Project	8	16	16 hours of research work + seminar presentations +	All 3rd Year Modules	C
F3813TD	Agricultural Engineering Design Project	8	16	14 hours of research work + seminar presentations + Report writing	All 3rd Year Modules	C
	Total credits Semester 2		64			
	Total credits Year 4		144			
	Total Credits for the Programme		588			

MODULE DESCRIPTORS

FIRST YEAR

U3583AL ACADEMIC LITERACY I

Module Title: ACADEMIC LITERACY I
Module Code U3583AL
NQF Level 5
Notional Hours 80
NQF Credits 8
Prerequisite None
Contact Hours 2 Lectures + 1 Tutorial/ week
Compulsory/Elective Compulsory
Semester Offered 0

Module Content
The module will cover study skills, reading (including extensive reading), listening, speaking, writing, referencing, and language usage and text organisation.

Student assessment strategies
Assessment will be based on Continuous Assessment.

I3500NI INTRODUCTION TO MECHANICAL ENGINEERING

Module Title: INTRODUCTION TO MECHANICAL ENGINEERING
Module Code I3500NI
NQF Level 5
Notional Hours 60
Contact hours 2 Lectures
Additional learning requirements Group work and Project.

NQF Credits	6
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory
Semester Offered	Core

Module Content

Introduction to Mechanical Engineering: What is mechanical engineering, historical perspective, the modern era and mechanical engineering. Critical skills for a mechanical engineering of today: software engineering and probability and statistics. Branches of mechanical engineering. Typical jobs of a mechanical engineer: Product design and manufacture, research and development, systems design and management, troubleshooting, safety and maintenance. Important Skills: Estimation in engineering, Problem solving and communication skills, Presenting engineering calculations. Basic principles of mechanical engineering: Introduction to mechanics (statics and dynamics), fluid mechanics, manufacturing and materials, Introduction to mechanisms, thermodynamics energy, Introduction to heat transfer. New fields of mechanical engineering and the impacts of technology.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments, Project and Presentation: 60%

ii) Tests (at least 2 tests):40%

Criteria for qualifying for the Examination:

No Examination

U3583DD DIGITAL LITERACY

Module Title:	DIGITAL LITERACY
Module Code	U3583DD
NQF Level	5
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial/ week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester 1

Module Content

Content: Digital Proficiency: ICT-based devices (laptops, tablets, smartphones, desktop computers, digital instruments and equipment); a mouse, keyboard, touch screen, voice control and other forms of input; screens, audio headsets and other forms of output; digital capture devices; University digital learning systems and a range of personal digital services such as social media, cloud storage services, sharing sites Digital Productivity: Basic productivity software (text editing, presentation, spreadsheets, image editing); email and other digital communication services; Internet or cloud or institutional shared spaces for Organising, managing and backing up digital files; software/apps and services suitable for learning-related tasks; digital tools fit learning and managing learning time . Information Literacy: search engines, indexes or tag clouds; wikis, blog posts, scholarly journals, e-books and the open web; file spaces and folders, bookmarks, reference management software and tagging; copyright, and digital citizenship issues. Data and Media Literacy: Digital data using spreadsheets and other media; data security and privacy; digital media messages – text, graphics, video, animation, audio and multimedia. Digital Creation and Innovation: digital materials (video, audio, stories, presentations, infographics); new digital tools for learning in digital settings. Digital Communication, Collaboration and Participation: digital communication; differences between media, norms of communicating in different spaces; false or damaging digital communications; collaborative tools and online environments; online networks. Digital Learning and Development: digital learning opportunities; digital learning resources; digital tools/materials for organising, planning and reflecting on learning (mind-mapping, note-taking, e-portfolio/ learning journal/ blog). Digital Identity and Wellbeing: online profiles for different networks (personal, professional, academic); digital reputation; managing personal data and privacy; digital CV or portfolio of work; digital technologies for personal development; online etiquette; wellbeing and safety online; internet addiction; cyberbullying and other damaging online behaviour.

Student Assessment Strategies

1. Collaborative assessment tasks

1.1 Digital productivity: cloud based collaborative digital media creation using cloud platforms

1.2 Project: Digital communication, collaboration and participation/ Digital Wellbeing

2. Individual assessment tasks

2.1 Assignment: information literacy assignment

2.2 Test x 2

3. Practical

3.1 Digital proficiency

3.2 Data and Media literacy

4. No written examination

U3420CN NATIONAL AND GLOBAL CITIZENSHIP

Module Title:	NATIONAL AND GLOBAL CITIZENSHIP

Module Code	U3420CN
NQF Level	4
Notional Hours	20
Contact hours	Up to 1 contact lecture periods per week for 6 Weeks
Mode of Delivery Blended:	Face to face and Online
Additional learning requirements	Each student will be required to work on a personal project which will include a site visit
NQF Credits	2
(Co-requisites)	
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module content
UNIT 1: Constitution and its Importance
What is a constitution; Functions of a constitution; What it contains; Constitution and democracy
UNIT 2: Global Citizenship
The meaning of global citizenship; Importance of global awareness; World issues of concern to global citizens.
UNIT 3: Civic Engagement
What do we mean by civic engagement; Dimensions of civic engagement; Indicators of civic engagement; Promoting civic engagement.
UNIT 4: Globalization
Understanding globalization; Cultural construction of neoliberal globalization; Major players; Major domains; Major Issues; Futures of Globalization
UNIT 5: Intercultural Communication
Dealing with difference; Levels of culture; Stereotypes and generalizations; Intercultural communication Processes
UNIT 6: Sustainable Development Goals and individual action
Introduction to SDGs; Contributing to achievement of SDGs through action

Student Assessment Strategies
Continuous assessment of 100% - Assessment will be done by completing online pop-up quizzes; and developing their online portfolios of personal action as response to tasks assigned in class.

YEAR 1 SEMESTER 1

I3511IM ENGINEERING MATHEMATICS I

Module Title:	ENGINEERING MATHEMATICS I
Module Code	I3511IM
NQF Level	5
Notional Hours	160
Contact hours	4 Lectures + 1 Tutorial / Week
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Lines and Planes: Vector equation of a line, Cartesian and parametric equation of a plane, intersection of lines and planes. Matrix Algebra: Matrix algebra, row reduced echelon form, determinant, adjoint, singular and non-singular matrices, inverse of a matrix, matrices and systems of linear equations, solution by Cramer's rule. eigenvalue-eigenvector problems. Hermitian and unitary matrices. Quadratic forms. Sequences and series of numbers: Introduction to sequences and series. Absolutely convergent series, tests for convergence. Power series. Radius of convergence and interval of convergence. Functions: Limits and continuity of functions: limit at a point, improper limit, and continuity. Exponential functions, logarithmic functions, hyperbolic functions, area functions. Polar coordinates/Graphs: Definition of polar coordinates, relate cartesian and polar coordinates, sketch and name different types of polar graphs. Differentiation: Definition of the derivative, differentiation rules, chain rule, differentiation of trigonometric functions, derivatives of higher order, concavity and curve sketching, optimization, related rates. Implicit differentiation, the chain rule, differentiation of algebraic functions. Integration: Anti-derivatives, Riemann sums, the definite integral, fundamental theorem of calculus, basic integration techniques, integration of trigonometric functions. Introduction to complex numbers: Definition of complex numbers and the complex plane, complex number representation on argand diagrams, complex number algebra. Demoivre's theorem.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (tutorials, quizzes): 40%
ii) Tests (At least 2 tests): 60%

Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 40% in the Continuous Assessment.
Criteria for passing the module

To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3531ID	ENGINEERING DRAWING
Module Title:	ENGINEERING DRAWING
Module Code	I3531ID
NQF Level	5
Notional Hours	160
Contact hours	4 Lectures +1 Tutorial and/or 1 Practical /Week
Additional learning requirements	None
NQF Credits	16
(Co-requisites)Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Foundations of Representing Technical Bodies: drawing equipment, drawing formats, types of lines, construction geometry, simplified representations, scales, lettering, tittle block, elaboration of part drawings, Principle of orthographic projection, sectioning, dimensioning. Isometric and oblique representations. Sections, Interpenetrations and developments: cones, cylinders, pyramids. Free hand techniques: Introduction to free-hand sketching of machine parts. Assembly Drawing. Introduction to AutoCAD: Setting up the drawing Environment; Using commands and system variables; Using coordinate systems; Working in two - dimensional space: Creating objects; Drawing with precision; Controlling the drawing display; Editing methods; Using layers and object properties; Adding text to drawings; Creating dimensions; Using blocks and external references; Managing content with AutoCAD design Centre; Creating a layout to plot; Plotting (model and paper spaces). Working in three - dimensional space: Creating three-dimensional objects using solid primitives, and from 2D profiles; editing of 3D objects. Practical Exercises.

Student Assessment Strategies
1. Students will be assessed through Continuous Assessments activities
2. The final mark will be made of 100% Continuous Assessment.
3 The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (At least 4 assignments): 40%
ii) Mini project: 20%
iii) Tests (At least 3 tests): 40%
Criteria for qualifying for the Examination:
No Examination
Criteria for passing the module
To pass this course a student should obtain a minimum final mark of 50%.

I3521NP	PHYSICS FOR ENGINEERS I
Module Title:	PHYSICS FOR ENGINEERS I
Module Code	I3521NP
NQF Level	5
Notional Hours	120
Contact hours	3 Lectures +1 Tutorial and/or 1 Practical /Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Measurements and Units: Instruments and Uncertainty, Standards and Units. Kinematics: One Dimensional Motion, Vectors, Projectile Motion, Circular Motion, Relative Motion. Dynamics: Newton's Laws of Motion, Newton's Law of Gravitation, Free-Body Diagrams, Friction. Work, Energy and Power. Momentum: Collisions, Impulse, Centre of Mass. Rotational Dynamics: Rolling Motion, Torque, Rotational Inertia and Energy, Angular Momentum. Planetary Motion: Kepler's Laws of Planetary Motion. Elasticity: Hooke's Law. Fluids: Pressure, Buoyancy, Fluid Dynamics: Flow Rates, Equation of Continuity and Bernoullis Equation. Heat and Thermodynamics: Thermal Expansion, Ideal Gas, Specific Heat, Heat Capacity, Latent Heat, Calorimetry, Heat Transfer: Laws of Thermodynamics, Entropy, Enthalpy, Gibbs Free Energy.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (tutorials, quizzes): 40%
ii) Tests (At least 2 tests): 60%
Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 40% in the Continuous Assessment.
Criteria for passing the module
To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3551CC COMPUTING FUNDAMENTALS

Module Title:	COMPUTING FUNDAMENTALS
Module Code	I3551CC
NQF Level	5
Notional Hours	120
Contact hours	3 Lectures +1 Tutorial and/or 1Practical /Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Computer Fundamentals: Development history of computer hardware and software. Hardwired vs stored program concept. Von-Neuman architecture. Harvard architecture: principle of operation, advantages, disadvantages. Single address machine. Contemporary computers. Computer system: block diagram, functions, examples, dataflow, control line. Computer Arithmetic: integer arithmetic (addition, subtraction, multiplication, division), floating-point representation (IEEE), floating-point arithmetic. arithmetic and logic unit (ALU). Introduction to CISC and RISC architecture: principle of operation, merits, demerits. Storage and Input/Output Systems: Computer function (fetch and execute cycles), interrupts, interconnection structures (Bus structure and bus types). Introduction of computer operating environment Windows and UNIX based systems. Computer Architecture: The design and structure of a computer. Information Processing and Data Analysis tools: Equations and Formulas Creation, Diagram Creation and Editing, PowerPoint Presentations Creation Advanced Spreadsheets Skills. Computer Program Planning. Flowcharts and Pseudocode Introduction to Computer Networking: Basics of Communication Systems and Computer Networks. Web Developments: Front-End Web Development, Web Page Styling and Website logic development with scripting languages such as JavaScript. Overview of memory system, memory chip organization and error correction, cache memory, memory storage devices. Introduction to Data Science Tools: Installation and basic use of Anaconda and Jupyter Notebooks.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes, reports, practical assignments): 20%
ii) Tests (At least 2 tests): 50%
iii) Semester Mini project (prototype oral presentation and development report): 30%

Criteria for qualifying for the Examination:
No Examination
Criterial for passing the course:
To pass this course a student should obtain a minimum final mark of 50%.

I3511NCCHEMISTRY FOR ENGINEERS

Module Title:	CHEMISTRY FOR ENGINEERS
Module Code	I3511NC
NQF Level	5
Notional Hours	160
Contact hours	4 Lectures + 1T or 1PS /Week
Additional learning requirements	
NQF Credits	16
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Spectroscopic techniques and Applications: Elementary idea and simple applications of Rotational, Vibrational, Ultravoilet & Visible and Raman spectroscopy. Electrochemistry: Nernst Equation and application, relation of e.m.f. with thermodynamic functions (ΔH, ΔF and Δ S). Lead storage battery. Corrosion; causes, effects and its prevention. Phase Rule and its application to water system. Battery Technology; Introduction - Galvanic cell, electrode potential, EMF of the cell and cell representation. Batteries and their importance, Classification of batteries- primary, secondary and reserve batteries with examples. Battery characteristics - voltage, capacity, energy density, power density, energy efficiency, cycle life and shelf life. Basic requirements for commercial batteries. Construction, working and applications of: Zn-Ag2O, Ni-Cd, Zn-air and Lithium-ion battery. Fuel Cells- Differences between battery and a fuel cell, Classification of fuel cells - based on type of fuel, electrolyte and temperature. Construction, working and applications of solid oxide fuel cell. Water Analysis; Hardness of water, Techniques for water softening (Lime-soda, Zeolite, Ion exchange resin and Reverse osmosis method), Alkalinity -determination, Determination of dissolved oxygen, Determination of chemical oxygen demand, Boiler scales-formation and ill effects, prevention of scales by external method (hot lime-soda process). Desalination by electrodialysis. Fuels: classification of fuels, Analysis of coal, Determination of calorific value (Bomb calorimeter and Dulong's methos). Solar energy- Photo voltaic cells-definition, working and importance of PV cells. Production of solar grade silicon by chemical vapor deposition. Polymer; Basic concepts of polymer-Blend and composites, Conducting and biodegradable polymers. Preparation and application of some industrially important polymers (BunaS, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organometallic compounds (Grignard reagent) and their applications. Environmental Chemistry; Air Pollution, Water Pollution, Radioactive Pollution, Solid Waste Management, Green Chemistry.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes, lab and field reports): 40%

ii) Tests (At least 2 tests): 60%

Criteria for qualifying for the Examination:

1. To qualify for the exam, a student must obtain a minimum of 50% in Continuous Assessment.

Criteria for passing the course:

1. To pass this course a student should obtain a minimum final mark of 50%.

I3512IM ENGINEERING MATHEMATICS II

Module Title:	ENGINEERING MATHEMATICS II
Module Code	I3512IM
NQF Level	5
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3511IM Engineering Mathematics I)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Further Matrix Algebra: eigenvalue-eigenvector problems. Hermitian and unitary matrices. Quadratic forms. Further Integration: Integration by parts technique. Integration by substitution. Integration of trigonometric functions. Integration of powers of trigonometric functions. Integration of trigonometric functions by substitution. Reduction formula. Applications of integration: areas, volumes of revolution, etc. Differential Equations: Meaning and solutions of differential equations. First order ordinary differential equations (separable, homogenous, Exact and linear types) and their applications. Solutions of second order linear ordinary differential equations with constant coefficients; initial or boundary value problems using the methods of undetermined coefficients and variation of parameters. Integral Transforms: Laplace Transforms (LT), Inverse transforms on derivatives and integrals, unit step functions, LT of derivatives and integrals, application to solve 1st and 2nd ordinary differential equations. Fourier Series and Transforms: Fourier series. Fourier sine and cosine series. Introduction to Fourier transforms and its applications in solving boundary value problems.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes): 40%

ii) Tests (At least 2 tests): 60%

Criteria for qualifying for the Examination:

To qualify for the exam, a student must obtain a minimum of 40% in the Continuous Assessment.

Criteria for passing the module

To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3542NP PHYSICS FOR ENGINEERS II

Module Title:	PHYSICS FOR ENGINEERS II
Module Code	I3542NP
NQF Level	5
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorials or 1 Practical session / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3521NP Physics for Engineers II)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Electrostatics: Electric charge, Current and Current Density, Electric field, Electric Potential, Resistance and Resistivity, Capacitance and Dielectrics. Magnetostatics: Biot-Savart law, Magnetic field, Magnetic materials, Motion of a Charged Particle in a Magnetic Field, Magnetic force, Ampere's Law; Torque and Magnetic Moments; Electromagnetic Induction: Electromagnetic Force (EMF), Faraday's Law of Electromagnetic Induction, Lenz's Law, Fleming's Right-Hand Rule, Inductance and Mutual Inductance. Vibrations and Waves: Simple harmonic motion, Oscillations, Wave Motion, Types of Waves, Standing Waves and Resonance. Sound: intensity of Sound, interference of Sound Waves, Doppler's Effect. Light and Optics: Reflection, Refraction and Diffraction, Snell's Law, Lenses, Lens Equation. Radioactivity: types of radioactivity.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x3-hour paper).

3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (tutorials, quizzes): 40%
ii) Tests (At least 2 tests): 60%
Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 40% in the Continuous Assessment.
Criteria for passing the module
To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3502EE FUNDAMENTALS OF ELECTRICAL ENGINEERING

Module Title:	FUNDAMENTALS OF ELECTRICAL ENGINEERING
Module Code	I3502EE
NQF Level	5
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial and/or 1PS/Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	(I3511IM Engineering Mathematics I)
None	
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Introduction: SI Units and notations, Basic Electric Circuit (resistance, voltage and current). Resistance: Resistor coding, Series and parallel resistor networks, Y and delta resistor networks. Sources: Voltage and Current sources, dependent and independent sources, source transformations. DC Circuit Analysis Techniques: Ohm's law, Power and Energy, voltage divider and current divider rules, Kirchhoff's laws, mesh and nodal analysis, DC Circuit Theorems: Superposition Theorem, Thevenin's and Norton's Theorem, Maximum power transfer theorem. Capacitors: Capacitance, capacitors in series and parallel, Capacitor charging and time constant. Inductors: Inductance and mutual inductance. AC Voltage: AC voltage generation, AC Resistive circuit, AC capacitive circuit, AC inductive circuit. Electrical Machine Basics: Basics principles of transformers, AC generators, DC motors, three phase voltage generation and mathematical expression. Basics of circuit simulation using CAD software).

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment.
3. The Continuous Assessment will be made up of the following assessment activities:
i) At least 2 quizzes, and at least 2 lab reports: 40%
ii) Tests (At least 2 tests): 60%
Criteria for qualifying for the Examination:
No Examination
Criterial for passing the course:
To pass this course a student should obtain a minimum final mark of 50%.

I3572IS MATERIALS SCIENCE

Module Title:	MATERIALS SCIENCE
Module Code	I3572IS
NQF Level	5
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial and/or 1PS/Week
Additional learning requirements	None.
NQF Credits	12
(Co-requisites)	
Prerequisite	(None)
None	
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Materials for Engineering: Introduction to Engineering Materials, Types of Materials, Processing-Structure-Property relationship of Materials, Competition among materials, Future trends of material usage. Structure of materials: Atomic structure, electronic configuration, atomic bonding; Crystallographic planes and directions: Miller indices; Bragg's law; Defects in crystals; Solidification, Crystalline Imperfections and Diffusion in solids; Solidification of Metals, Single Crystals, Metallic Solid Solutions, Crystalline Imperfections and Atomic diffusion in Solids; Equilibrium phase diagrams: unary, binary and ternary systems. Invariant reactions: eutectic, eutectoid, peritectic, peritectoid systems. Proportion of phases based on the lever rule. Practical phase diagrams from non-ferrous alloy systems. Properties of Materials: review of Mechanical, Electrical, Optical and Thermal properties of materials. Mechanical properties of materials: Stress and Strain, Tensile testing, True stress and True strain, Deformation modes; Yield and Fracture, Hardness testing, bend test, impact test, simple fracture mechanics and strengthening mechanisms. Effects of environment on materials: corrosion and oxidation of metals, electrode potential, electrochemical cell, mechanisms of corrosion, corrosion prevention, degradation of polymeric materials. Real-world applications of Engineering materials: Functional Materials & Devices; The Relationship between Materials Science and the Fourth Industrial Revolution. Basic criteria for the selection of materials for engineering applications.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes, lab and field reports): 40%
ii) Tests (At least 2 tests): 60%

Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 50% in Continuous Assessment.
Criteria for passing the course:
To pass this course a student should obtain a minimum final mark of 50%.

I3532NM ENGINEERING MECHANICS I

Module Title:	ENGINEERING MECHANICS I
Module Code	I3532NM
NQF Level	5
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial and/or 1PS/Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3521NP Physics for Engineers I)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

System of forces and moment forces: Coplanar forces, addition of forces, couples and moments, resultants and equivalent systems. Equilibrium of a rigid body in two dimensions, line of action, free body diagram, adequacy of constraints and equilibrium positions. Equilibrium in three dimensions. Forces in submerged surfaces. Distributed Forces: Centroid and Center of Gravity, Friction: Dry friction, wedges, screws, journal and thrust bearings, rolling resistance, belt friction. Beams: shear force and bending moment diagrams. Analysis of forces in a truss: Method of joints, method of sections.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (At least 4 assignments): 20%
ii) Tests (At least 2 tests): 60%
iii) Practical and Report: 20%

Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 50% in Continuous Assessment.
Criteria for passing the course:
To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3552IS STATISTICS FOR ENGINEERS

Module Title:	STATISTICS FOR ENGINEERS
Module Code	I3552IS
NQF Level	6
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial Session / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3511IM Engineering Mathematics I)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content

Probability: Theory (Random experiments, Random events), conditional probability and Bayes theorem, mathematical expectation and decision making. Probability Distributions and Densities: Binomial, Geometric, Hypergeometric, Poisson, Normal, uniform, Gamma, Beta and Weibull. Sampling Distributions: Mean, variance, inferences concerning mean and proportions: point and interval estimations, parametric tests, nonparametric tests. Regression and Correlation: Simple and multiple linear regressions, correlation. The logistic regression model. Analysis of Variance: Completely randomized and randomized block designs, multiple comparisons. Introduction to Data Analysis with R: Lab 1: Measures of Central Tendency: mean, median, and other quantiles, mode. Saving and Using Graphics etc. Lab 2: Measuring Variability: variance and standard deviation, median, Interquartile Range, coefficient of variation, covariance and correlation of variables. Lab 3: Measuring Symmetry: skewness, kurtosis, etc. Frequency distributions: histograms, bar charts, pie charts, box plots, line graphs, scatterplots.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).

3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (Lab assessment): 40%
ii) Tests (At least 2 tests): 60%

SECOND YEAR

SEMESTER CORE

U3683AL ACADEMIC LITERACY II

Module Title:	ACADEMIC LITERACY II
Module Code	U3683AL
NQF Level	6
Notional Hours	80
NQF Credits	8
Prerequisite	U3583AL
Contact Hours	2 Lectures + 1 Tutorial per week
Compulsory/Elective	Compulsory
Semester Offered	0

Module Content
The module will cover study skills, reading, listening, speaking and writing, referencing, language usage and text organisation.

Student assessment strategies
Assessment will be based on Continuous Assessment.

I3620IE ENGINEERING ENTREPRENEURSHIP

Module Title:	ENGINEERING ENTREPRENEURSHIP
Module Code	I3620IE
NQF Level	6
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial / Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory
Semester Offered	Core

Module content
Entrepreneurship: - concept of entrepreneurship, characteristics of an entrepreneur, examples of good local and international entrepreneurial ventures, feasibility studies and business plan development and its components, government policies and regulations for starting new business ventures. Entrepreneurship opportunities in Engineering: innovative ideas and process of innovation, transformative and incremental innovations, innovation and business development, product development process and market research. Risk management: types of risk, risk management process, risk control and mitigation, risk response. Change management: Importance of change management, group dynamics and communication. Strategic business management: Management functions, strategic planning and management, resource management plan. Strategic marketing management: Marketing functions, marketing mix, innovative marketing, competitor analysis

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments: 20%
ii) Tests (At least 3 tests): 50%
iii) Written reports: 30%
Criteria for qualifying for the Examination:
No Examination
Criteria for passing the course:
To pass this course a student should obtain a minimum final mark of 50%.

I3640IW WORKSHOP PRACTICE

Module Title:	WORKSHOP PRACTICE
Module Code	I3640IW
NQF Level	6
Notional Hours	80
Contact hours	3 PS/Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory

Semester Offered Core

Module Content
Safety procedures applicable to engineering workshops: Safety equipment; Protective clothing; Signage. Use of workshop hand tools. Principles and practices of: Masonry and brickwork; Machining Operations (cutting, drilling, turning, milling, shaping); Sheet metal and fitting; Welding fabrication; Auto mechanics; Electrical wiring and installation; Soldering and de-soldering of electronic components; Carpentry and woodwork; Plumbing and pipe fitting; Refrigeration and air-conditioning systems and their installation.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:
i) At least 5 practical reports: 40%
ii) Fabricated Components: 60%
Criteria for qualifying for the Examination:
No Examination
Criteria for passing the course:
To pass this course a student should obtain a minimum final mark of 50%.

YEAR TWO SEMESTER 1

I3611IM ENGINEERING MATHEMATICS III

Module Title:	ENGINEERING MATHEMATICS III
Module Code	I3611IM
NQF Level	6
Notional Hours	160
Contact hours	4 Lectures + 1 Tutorial / Week
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	(I3512IM Engineering Mathematics II) I3511IM Engineering Mathematics I
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Vector Calculus: Vector valued functions, limits, continuity, differentiation, partial differentiation. Scalar and vector fields, space curves, tangent to curves, normal, binomial, torsion, curvature. Functions of several variables: limits, continuity, derivatives, differentials, the Jacobian, matrix and determinants, composite functions, higher order derivatives. Applications: optimization on surfaces, constrained optimization. The gradient of a scalar field, the del operator and its properties, the directional derivative, the divergence, the curl, physical and engineering applications. Power Series and their applications: Power series. Radius of convergence and interval of convergence. Power series representation of functions, Taylor and Maclaurin series, the Binomial theorem. Power series solutions to ODEs with variables coefficients. Analytic Functions: Complex functions, derivatives, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formulae, Taylor series, singular points, poles. Laurent series, Residues, Residue Theorem and evaluation of complex integrals.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (tutorials, quizzes): 40%
ii) Tests (At least 2 tests): 60%
Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 40% in the Continuous Assessment.
Criteria for passing the module
To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3601IE ENGINEERING ECONOMICS

Module Title:	ENGINEERING ECONOMICS
Module Code	I3601IE
NQF Level	6
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial / Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	(None)
Compulsory/Elective	Compulsory
Semester Offered	1

Module content

Microeconomics: economic concepts, economic problems, demand and supply, consumer choice and demand theory, production functions, production costs, profit maximisation: Time value of Money: time value of money, investment analysis (NPV, ROR, IRR, ROI, CBA, etc), depreciation methods (straight line, reducing balance, some of digits) Macroeconomics: inflation and deflation, business cycle, monetary and fiscal policies, unemployment, international trade. Financial accounting: product costing, cost accounting, Cost estimation, financial statements and budgeting. Introduction to marketing: marketing principles.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 2-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments: 40%
ii) Tests (At least 2 tests): 60%

Criteria for qualifying for the Examination:
To qualify for the exam, a student must obtain a minimum of 40% in the Continuous Assessment.
Criteria for passing the module
To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous Assessment and Examination.

I3631IC COMPUTER PROGRAMMING I

Module Title:	COMPUTER PROGRAMMING I
Module Code	I3631IC
NQF Level	6
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial or 1PS /Week Additional learning requirements Include any compulsory field trips / excursions (outside the normal practical); attachments / group work / project etc.
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3551CC Computing Fundamentals)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Programming Languages – preliminaries, history, and evolution, Describing Syntax and Semantics (Lexemes, tokens, Language recognizers, Language generators, Context-free grammars, Backus-Naur Form (BNF), Extended BNF, Syntax diagrams, Parse trees, Ambiguity, Unambiguous grammar, Attribute grammar) Lexical and Syntax Analysis (Lexical analysis, Parsing problem, Top-down parsing, Bottom-up parsing, Recursive-descent parsing, LL and LR parsers). Names, Bindings, Type Checking, and Scopes. Data Types, Functional Languages, Object-Oriented (OO) Language Comparism. Annotation and Aspect-oriented programming. Declarative Language. Programming languages, data processing concepts as numerical networks using interaction time-shared terminal computer systems, writing, debugging and running programs on different digital computer systems. Problem Solving: Introduction to problem solving through basic data structures and algorithms, Fundamental concepts of programming: Data types, variables, program flow control and decisions, loops, string manipulation, functions, file manipulation, lists and vectors and their manipulations. Debugging and Testing: correctness proofs, code tracing, peer reviews and execution testing. C/MATLAB for engineers: Introduction to the C/MATLAB programming environment, charts creation and manipulation in matlab, Introduction to toolboxes in C/MATLAB, GUI development in C/MATLAB, Introduction to Simulink and its application to engineering problems.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes, reports, practical assignments): 20%
ii) Tests (At least 3 tests): 50%
iii) Semester Mini project (prototype oral presentation and development report): 30%

Criteria for qualifying for the Examination:
No Examination
Criterial for passing the course:
To pass this course a student should obtain a minimum final mark of 50%.

I3651VM STRENGTH OF MATERIALS

Module Title:	STRENGTH OF MATERIALS
Module Code	I3651VM
NQF Level	6
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial or 1PS /Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Pre-requisite	(I3532NM Engineering Mechanics I)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Stresses and strains in one-dimension: introduction to stresses and strains; direct tensile test; Hooke's law and Modulus of Elasticity; ductility; Normal stress and strain; Poisson's ratio; Thermal stresses and strains; Axially-loaded bars, composite bars, axially-loaded bars of varying cross sections and bars loaded at intervals; Simple indeterminate problems on direct tension and compression; Compound bars; Shear stresses and strains; Modulus of rigidity. Stresses and strains in two and three dimensions: analysis of two- and three-dimensional state of stress; transformation of stresses and strains; principal stresses and maximum shear stresses; analysis of two and three-dimensional state of strain; Mohr's circle of stress and strain; Volumetric strain; Bulk modulus. Geometrical characteristics of plane sections: centroids of simple and complex areas; second moment of area; polar moment of area; section modulus; parallel axes theorem; perpendicular axes theorem. Bending and shear stresses in beams: theory of beam bending; composite beams; shear stress distribution due to bending. Combined bending and direct stresses in structural members. Unsymmetrical bending. Shear stress in thin-walled open sections. Shear centre. Material failure: failure theories of materials; Creep; Fatigue; Fracture; Stress concentration. Elastic instability: buckling of struts. Simple torsion: pure torsion of circular bars; shear stress and shear strain in shafts; torsional rigidity; torsion of hollow shafts. Stresses in thin cylinders and spheres: thin cylindrical and spherical shells subjected to internal pressure; hoop stress; longitudinal stress. Laboratory demonstrations: direct tensile test; elastic modulus/ductility; torsion; fracture; stress concentration; buckling of struts.

Student Assessment Strategies
1. Students will be assessed through Continuous Assessment (CA) and an end-of-semester examination
2. The final mark will be made up of 50% Continuous Assessment (CA) and 50% end-of-semester examination (1 x 2-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i. Laboratory reports: 20% of CA.
ii. Assignments: 20% of CA.
iii. 2 Tests: 60% of CA.

4. End-of-semester examination: (1 x 2-hour paper): 50%.

I3642NM ENGINEERING MECHANICS II

Module Title:	ENGINEERING MECHANICS II
Module Code	I3642NM
NQF Level	6
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial or 1PS /Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	(I3532NM Engineering Mechanics I)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Particle Dynamics: Kinematics of particles: Laws of motion, displacement, velocity, acceleration. Rectilinear Motion, rectangular coordinates. Plane curvilinear motion: normal, tangential and polar coordinates. Constrained motion of connected particles. Motion relative to translating axes, Motion relative to rotating axes. General relative motion. Projectiles. Angular motion. Cylindrical coordinates systems. Kinetics of particles: Newton's Second Law of Motion. Equations of motion and their solutions for rectilinear and plane curvilinear motion. Work-energy principle. Power and efficiency. Conservation of energy. Principle of linear impulse and momentum. Angular momentum. Kinetics of a system of particles. Generalized Newton's Second Law. Work-energy principle. Impulse-momentum principle.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 2-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (At least 3 assignments): 40%
ii) Tests (At least 2 tests): 60%

I3661NM ENGINEERING MATERIALS

Module Title:	ENGINEERING MATERIALS
Module Code	I3661NM
NQF Level	6
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial or 1PS/Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	(I3572IS Materials Science)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Classification and Characteristics of Steels: Review of the Iron-Iron Carbide phase diagram. Plain carbon steels, alloy steels, stainless steels, Special heat treatments for steels: Case hardening, austempering, martempering, Hardenability of steels, Jominy End-Quench test, Annealing and recrystallization. Characteristics of Cast Irons: Grey iron, nodular iron, austempered

ductile iron (ADI). Characteristics of Non-Ferrous Alloys: Copper, aluminium, titanium, nickel and their alloys. Practical application of strain hardening and precipitation hardening on selected alloys. Polymers and Plastics: polymerization processes, degree of polymerization, classification of polymers, glass transition temperature. Common thermoplastics, common thermosetting plastics, common elastomers. Ceramics: Traditional ceramics, technical ceramics, structural and functional properties of technical ceramics. Composite Materials: Polymeric, metallic and ceramic matrices, fibres for reinforcement, effect of fibre volume fraction on properties. Longitudinal and transverse loading of composites: stress analysis and modulus of elasticity. Shear modulus of composites for parallel model (isostrain) and series model (isostress). Nanomaterials - Introduction of nanomaterials and nanotechnologies, Features of nanostructures, Background of nanostructures, Techniques of synthesis of nanomaterials, Mechanical properties of nanomaterials, Tools of the nanoscience, Applications of nanomaterials and technologies.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 2-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (At least 2 assignments): 20%
ii) Practical reports: 20%
iii) Tests (At least 2 tests): 60%

4. To pass this course a student should obtain a minimum exam mark of 40% and average of 50% from both the Continuous

I3612IM ENGINEERING MATHEMATICS IV

Module Title:	ENGINEERING MATHEMATICS IV
Module Code	I3612IM
NQF Level	6
Notional Hours	160
Contact hours	4 Lectures + 1 Tutorial / Week
Additional learning requirements	None
NQF Credits	16
(Co-requisites)	
Prerequisite	(I3511IM Engineering Mathematics I) I3512IM Engineering Mathematics II
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Systems of Linear Differential Equations: Homogeneous and nonhomogeneous systems and their methods of solutions: The Laplace Transform method and the matrix methods (eigenvalue-eigenvector approach). Partial Differential Equations: Partial differential equations classification; elliptic, parabolic and hyperbolic. Neumann, Dirichrit boundary conditions of PDEs. Method of separation of variables to the heat and wave equations; vibrations of a stretched elastic string fixed at both ends. Integral Calculus of Functions of Several Variables: Double and triple integrals, Double, triple and iterated integrals, Line integrals in the plane, Green's Theorem, Independence of path, Surface integral, Divergence theorem, Stoke's theorem, Irrotational and solenoidal fields, Physical and engineering applications. Numerical Methods: Zeros of functions, Polynomial interpolation and least squares approximation, numerical differentiation and integration. Numerical solution of first order ordinary differential equations and boundary value problems.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes): 40%
ii) Tests (At least 2 tests): 60%

I3652CP COMPUTER PROGRAMMING II

Module Title:	COMPUTER PROGRAMMING II
Module Code	I3652CP
NQF Level	6
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial or 1PS /Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3631IC Computer Programming I)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:

Recognized standards, guidelines and models used in programing. Flowchart ANSI symbols and usage. Extensive examples, and programing exercises using pseudo-code/flowchart to solve practical problems in engineering. Code Debugging techniques. Advanced Problem Solving: Top-down stepwise refinement approach. Structured Programming: Standard Libraries in C, arithmetic and logical operators, Bitwise operators and bit masking; Precedence and Associativity of Arithmetic Operations; Unary Operators; Structs, Union and Enums. Symbols, keywords, identifiers, data types, operators, conditional and control structures, function, recursive functions Selection Structures Repetition Structures. Looping and While structures; Arrays, Strings, and Pointers: Arrays; Storing and accessing Values in Arrays; Pointers; Advanced string and file manipulation; Structures

and Unions: If statements; Nested if; the switch statement; the Conditional Operator File Handling: Concept of a file, files and streams, standard file handling functions, binary files, random access files. Advanced Topics: Command line parameters, pointers to functions, creation of header files, stacks, linked lists, bitwise manipulation. Software development in C in MS Windows, UNIX/LINUX environments. Extensive examples, and exercises programming in C to solve practical problems in engineering. Advanced Functions: Functions definition; Functions declaration/prototyping; Functions calling; Functions arguments; Recursion. Object Oriented Programming: Classes; Inheritance; Encapsulating; Polymorphism; Operators and Functions Overloading and Overriding; Debugging and Exceptions Handling: The try-catch clause. Numerical differentiation and integration using programming.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment.
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes, reports, practical assignments): 20%
ii) Tests (At least 3 tests): 50%
iii) Semester Mini project (prototype oral presentation and development report): 30%

I3652EM ELECTRICAL MACHINES I

Module Title:	ELECTRICAL MACHINES I
Module Code	I3652EM
NQF Level	6
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial or 1PS /Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3502EE Fundamentals of Electrical Engineering)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:

Introduction to electric machinery (review of magnetism); Principles of rotating machines, Principle of Magnetism (Magnetic field lines and their Properties, Flux and Flux density), Production of Rotating magnetic field (EMF and Faradays laws of Electromagnetic induction, Review of Magnetic circuit. DC machines (DC generator and Motor); Construction and principle of operation, EMF equation of DC Machine, armature reaction, commutation, Equivalent circuit of DC Generator and DC Motor, Characteristic of DC. Generators (Types of DC Generators, Characteristics of DC. Motors (Types of DC Motors), Power Flow and DC Machines Efficiency. Single Phase Transformers; Construction and Principle of operation, Transformer EMF Equation, Ideal Transformer and its characteristics, Classification of Transformer and Applications, Practical Transformer and its characteristics, Transformer tests (Open circuit and short circuit), Transformer efficiency, Auto- transformer (Characteristic and principle of operation). Three phase induction motor; Construction and principle of operation, EMF equation, Equivalent circuit,Power flow and motor efficiency , Torque-slip characteristic, Motor Tests (No load test and Blocked rotor test), Starting and speed control techniques of Induction motor, Applications, Motor Drives (DC drives principle of operation and industrial Applications).

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 60% Continuous Assessment and 40% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (at least 2): 20%,
ii) Labs (at least 3): 30%,
iii) Tests (at least 2): 50%

I3632NF FLUID MECHANICS I

Module Title:	FLUID MECHANICS I
Module Code	I3632NF
NQF Level	6
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial and/or 1 Practical Session / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3532NM Engineering Mechanics I)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Introduction to fluid mechanics; properties of fluids (density, viscosity, vapour pressure); fluid equilibrium; units. Fluid Statics: The governing differential equations; pressure distributions, manometric pressure measurement; fluids in relative equilibrium; forces on submerged surfaces; buoyancy. One-dimensional flows with inertia: 1-D mass conservation (Continuity equation); 1-D momentum conservation (Bernoulli equation); total head diagrams; flow measurement; Flow states: laminar vs turbulent, steady vs unsteady, uniform vs non-uniform, continuous vs discontinuous, sub-critical vs super-critical. Hydraulic systems: Energy changes in systems; pipe friction (continuous hydraulic energy losses: laminar and turbulent friction factors, Moody diagram); local hydraulic energy losses: loss coefficients and applications. Lab practical: 1. Hydrostatics, 2. Fluid dynamics: Discharge

determination, 3. Fluid dynamics: Energy shares in a pressurised system (pressure and velocity dependencies) and 4. Fluid dynamics: Determination of continuous and local hydraulic losses.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (At least 3 assignments): 20%
ii) Practical reports: 40%
iii) Tests (At least 2 tests): 40%

I3622ND	MECHANICAL ENGINEERING DESIGN I
Module Title:	MECHANICAL ENGINEERING DESIGN I
Module Code	I3622ND
NQF Level	6
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial or 1PS/Week
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	I3532NM Engineering Mechanics I
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content

Design methodology: problem investigation and identification, the role of system requirements, solution development and assessment strategies, problem solving approaches, consideration of alternative options during the designs development, appropriate application of engineering sciences to a design problem. Technical communication: Introduction to computer aided design, part drawings, manufacturing drawings, assembly drawing, assembly and reading of drawings, particular dimensioning rules, surface finish symbols, semi-finished products, technical reports, presentations skills Consideration for tolerances, fits and reliability. Stress analysis in machine components: theories of stress analysis and failure to engineering design problems, application of shear force and bending moment diagrams, stress analysis and principal stresses and Mohr's circle in static and fatigue failure, factors of safety and analysis and sizing of various mechanical components.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 2-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (At least 3 assignments): 20%
ii) Mini design projects: 40%
iii) Tests (At least 2 tests): 40%

I3622CM	MEASUREMENTS AND INSTRUMENTATION
Module Title:	MEASUREMENTS AND INSTRUMENTATION
Module Code	I3622CM
NQF Level	6
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial or 1PS/Week Additional learning requirements Include any compulsory field trips / excursions (outside the normal practicals); attachments / group work / project etc.
NQF Credits	8
(Co-requisites)	
Prerequisite	(I3502EE Fundamentals of Electrical Engineering)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:

Systems of Units and Standards of Measurement: Absolute, derived and fundamental units. Advantages of electronic and electrical measurements. Standards and types of standards. International Standards, Primary Standards, Secondary Standards, Working Standards. Errors: sources of error. Types of errors, statistical analysis of error. Performance characteristics of Instruments: Static characteristics (Accuracy, Precision, Sensitivity, Reproducibility, and Tolerance etc.) Dynamic characteristics (Speed of response, Fidelity, Lag, dynamic error etc.). Calibration: Principles of calibration, calibration chain, calibration records. Elements of generalized measurement system, Functional elements of an instrument: Primary sensing element, variable conversion element (analogue to digital conversion), variable manipulation / conditioning element- (data amplification, attenuation) - data processing element (filtering), data transmission element, data storage element (chart recorders, computers, memory storage devices etc.), data presentation element/ termination stage. Instrument classification: active or passive instruments, null and deflection type instruments, analogue and digital instruments, indicating instruments and instruments with a sound output, smart and non-smart instruments. Bridge measurement (Wheatstone, Kelvin, Maxwell Anderson, Wien etc.) Electrical indicating and test instruments: Construction and operation of Digital meters (Voltage-to-time conversion digital voltmeter, Dual-slope integration digital voltmeter), Analogue meters - Construction and operation of Analogue meters: Moving-coil meters, moving iron meter, clamp on meter, techniques for measurement of high frequency signals. Noise in Measurement Instruments: Causes/ sources of Noise (Capacitive/ electrostatic, Inductive, multiple earth, thermoelectric potentials, shot noise,). Noise reduction techniques. Measurements of electrical and non-electrical quantities:

Sensors and transducers: Transducer Characteristics, Mechanical vs electrical transducers. Transducer classification: active and passive transducers, on the basis of transduction principle used, analog and digital transducers, primary and secondary transducers, Transducer types: potentiometric transducers, LVDT, thermocouple, capacitive, inductive, piezoelectric. Transducer circuits: temperature sensors, fire detector etc. Oscilloscopes: Internal architecture and operation, principle of signal display, voltage, current, period and frequency measurement. Signal generators: Requirements of a signal generator, sine wave generator, basic theory of oscillators (Wein bridge, RC phase shift, Hartley & Colpitts), RF signal generation, Lab type signal generator, function generator (specification and principle of operation), Spectrum analysers: characteristics and principle of operation.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 50% Continuous Assessment and 50% Examination (1 x 2-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (tutorials, quizzes): 5%
ii) Lab practical (At least 4 labs): 35%
iii) Tests (At least 2 tests): 60%

THIRD YEAR

CORE SEMESTER

F3710TA RESEARCH METHODS IN AGRICULTURAL ENGINEERING

Module Title :	RESEARCH METHODS IN AGRICULTURAL ENGINEERING
Module Code	F3710TA
NQF Level	7
Notional hours	120
Additional learning requirements	Field trips
Contact Hours	03 Lecture hours / week / semester; 02 Practical hours / week / semester
NQF Credits	12
(Co-requisites)	
Prerequisite	I3552IS
Compulsory/Elective	Compulsory
Semester offered	1

Module Content

Research methodology processes in Agriculture Engineering: Proposal writing for specified audience, presentation of proposal (Orally and in writing), general structure of a research project; Problem formulation; Literature search, major data bases for agriculture engineering literature and methodological approach to solving agriculture engineering problems. Review of basic Experimental designs: Principles of experimental Designs, CRD and RCBD, Analysis of Variance and post-hoc methods. Advanced engineering experimentation: Response Surface Methodology, Analysis of Quadratic Models, Analysis of Covariance models (General regression significance test), parametric model diagnostic checks, Data transformation, and basics of non-parametric tests. Computer Packages for data handling: Students will be introduced to any one of SAS, Minitab, STATA, with application in handling experimental models. Students will be required to interpret output from the package and present the results in a scientific manner.

Student Assessment Strategies

Continuous Assessment: 100%

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3730TB HYDRAULICS AND HYDROLOGY

Module Title:	HYDRAULICS AND HYDROLOGY
Code:	F3730TB
NQF Level	7
Notional hours	120
Contact Hours:	03 Lecture hours / week / semester; 02 Practical hours / week / semester
Additional learning requirements	Field trips
NQF Credits	12
(Co-requisites)	
Prerequisite	I3632NF
Compulsory	Compulsory
Semester offered	1

Module Content

Hydrological cycle: water resources, rainfall processes and data; the determination and measurement of evaporation and transpiration; Infiltration calculation and modelling; flood frequency determination and analysis, rational method, unit hydrograph analysis; time-area routing, reservoir routing, Muskingum routing, storage draft analysis; soil erosion and sediment production. Flow measurement: stream flow measurement and analysis, hydrological modeling. Review of Fluid Mechanics: Fluid properties; Hydrostatics; and Basic hydrodynamics (Bernoulli equation, force, momentum, flux equation, continuity

equation; ideal flow patterns, streamlines, flow nets; real flow, laminar and turbulent flow, boundary layers and drag). Flow resistance in pipes and channels; dimensional analysis and models. Flow with pressure gradient between parallel plate, pipes and channels. Analysis of fluid machinery; Design of pipeline networks. Pipe networks (simple branching circuits, single node reservoir systems, pipe reticulation systems Permanent pressurized flows. Design of pumps. Variable pressure flows. Water hammer. Open channel flow. Flows over free surfaces: Flow resistance in channels; Flows with uniform regiments. Damper systems. Flow through spillways and stilling basins. Disturbed flows (bridges and culverts) Basic design of hydraulic structures: Spillways, stilling basins, weirs, culverts, dams, reservoirs, canals.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

SEMESTER 1

F3751TC LIVESTOCK AND CROP PRODUCTION SYSTEMS

Module Title:	LIVESTOCK AND CROP PRODUCTION SYSTEMS
Module Code:	F3751TC
NQF Level	7
Notional hours	120
Contact Hours:	3 Lecture hours / week / semester; 2 Practical hours / week / semester
Additional learning requirements	Field excursions
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/ Elective	Compulsory
Semester offered	1

Module Content
The role of livestock and agriculture in the national economy and gives a broad overview of the industry, potentials, competitiveness and constraints. different production systems, their impacts on the environment, productivity levels and sustainability. breed and species adaptability to the environments; drought and its effects; the management of ruminants and non-ruminants with regard to breeding, nutrition, health and housing; livestock management facilities; harvesting, handling and marketing of livestock products. constraints facing communal and commercial farmers in Namibia.
The history of Namibian agriculture, Structure of Namibia agriculture (Land tenure systems), Crop production, climate and weather, Effects of weather elements on crop production, The agro-ecological regions in Namibia, Plant nutrition management, Cropping systems, Agro-forestry, Crop rotation principles and examples of rotations in Namibia, Crop classification, growth, development and water relations; production management; production cycle of specific field crops grown in Namibia (Cereals crops (pearl millet, maize, wheat, sorghum, rice), oilseed crops (sunflower, soybean, groundnut, caster bean), grain legumes (cowpea, bambara nuts, kidney beans), fiber crops (cotton, sisal), root and tuber crops (sweet potatoes, cassava, Irish potatoes); Tillage, Aims and objectives of tillage, Timing of tillage and Tillage practices, Agronomic considerations for adopting a tillage system, Seed and seeding, Seed analysis, Plant density, Planting methods, Factors affecting plant stand, Weed, Pest and disease management, Harvesting and storage of crops, Methods of harvesting, Marketing alternatives, Managing risk in crop production. Visits to commercial agricultural production areas with lots of agricultural engineering machinery and equipment used for crop production.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

I3731NM CONTROL SYSTEMS

Module Title:	CONTROL SYSTEMS
Module Code	I3731NM
NQF Level	8
Notional Hours	120
Contact hours	3 Lectures + 1 Tutorial and/or 1PS/Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	(I3622CM Measurements and Instrumentation)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Control Systems Basics: Fundamentals of control Theory, applications of control systems, open and closed loops. Modelling of Physical Systems: Laplace transform review, transfer functions, poles and zeros, block diagrams reduction, signal flow graphs, state variable models, conversion of transfer function to state space and vice-versa, frequency response representation, modelling of mechanical and electrical dynamic systems Control System Analysis: system response (transient and steady state) using transfer functions, system response (transient and steady state) using state equations. System stability analysis using Routh's stability criterion, stability in state space representation, frequency response parameters and stability analysis (phase

margin, gain margin and Nyquist criterion), steady state errors from transfer function, steady state errors for state space represented systems, steady state errors from frequency response, transfer function from frequency response, Root Locus Method, Analysis using Root Locus method. Control Systems Design and compensation techniques: Design using root locus (PID controllers), Design using frequency response (lead, lag and lead/lag compensators), design via state space, practical implementation of controllers/compensators.

Student Assessment Strategies

1. Students will be assessed through continuous assessments activities and a final examination
2. The final mark will be made of 60% Continuous Assessment and 40% Examination (1 x 3-hour paper).
3. The Continuous Assessment will be made up of the following assessment activities:

i) Assignments (At least 3 assignments): 20%
ii) Practical report: 20%
iii) Mini design projects: 30%
iv) Tests (At least 2 tests): 30%

F3771TD	FARM POWER, MACHINERY AND MANAGEMENT
Module Title:	FARM POWER, MACHINERY AND MANAGEMENT
Module Code:	F3771TD
NQF Level	7
Notional hours	120
Contact Hours:	3 Lecture hours / week / semester; 2 Practical hours / week / semester
Additional learning requirements	Field excursions
NQF Credits	12
(Co-requisites)	
Prerequisite	13642NM
Compulsory/Elective	Compulsory
Semester offered	1

Module content

Types of farm power, mechanization and their importance in Agricultural production. Principles of operation of internal combustion (I.C) engines, Engine and engine accessories, Diesel and petrol engines, Engine tests, Fuel supply and cooling system of engines, Electrical and ignition, Lubrication, Ignition, Steering, Power Transmission, Hydraulic and braking Systems. Primary and secondary tillage, planting, chemical application, and harvesting equipment. The selection and operation of both machinery and tractors and draught animals. Safety, use, maintenance, adjustment, calibration, and repair of the agricultural equipment and machinery. Performance of different farm power units and implements; factors determining their selection; their efficient use; and maintenance major types of tillage equipment; field capacity of various sizes of tillage equipment; Operate tillage equipment safely under field and transport conditions; Calibration of planting, fertiliser, herbicide and insecticide application rates under field conditions; pest control and chemical application equipment; major types of sprayers and pumps; methods of harvesting crops; potential field capacity for various sizes of harvesting equipment; harvest losses; harvesting equipment; machinery costs and other farm costs; power requirements for various types of machinery based on needed capacity and available time. Agricultural/farm processing equipment – Grinding, Cutting, Mixing and residue disposal. Material handling. Special farm and livestock equipment. Dairy machinery. Agricultural Machinery Management: costing, maintenance and machinery management

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3701TE	IRRIGATION THEORY AND PRACTICE
Module Title:	IRRIGATION THEORY AND PRACTICE
Module Code:	F3701TE
NQF Level	7
Notional hours	80
Contact Hours:	02 Lecture hours / week / semester; 02 Practical hours / week / semester
Additional learning requirements	Field excursions
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/ Elective	Compulsory
Semester offered	1

Module Content

Water Resources; Irrigation principles: Evapo-transpiration, plant-soil-water relationship, Irrigation Agronomy, Crop water requirements, Irrigation scheduling, irrigation efficiencies. Problem soil management and reclamation, Engineering: Planning and irrigation project, Land grading and field layout, choosing an irrigation method, Structures and equipment used in irrigation, measurement of irrigation water and delivery rates. Irrigation methods: Irrigation Operation and management of Surface irrigation, sprinkler irrigation and Trickle/drip irrigation border, check basin, furrow; Drainage of irrigated land: Environmental concerns related to irrigation and drainage. Alternatives to irrigation: water harvesting Robotics: use of robotics, automation and precision agriculture, use of drones for soil and field analysis for irrigation and fertigation.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

SEMESTER 2

F3722TF	SOIL MECHANICS AND CULTIVATION
Module Title:	SOIL MECHANICS AND CULTIVATION
Module Code:	F3722TF
NQF Level	7
Notional hours	80
Contact Hours:	02 Lecture hours / week /semester; 02 Practical hours / week / semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/ Elective	Compulsory
Semester offered	2

Module Content
Dynamics of Soil: History of tillage and traction, Stress and strain in soil, Soil strength, Two and three-dimensional stresses, Principal stresses, Active and passive earth pressure, Stretching of soil, Compression of soil, Emphasis on particulate mechanics. Mechanics of tillage tools: Forces acting on tillage tool, draft computation, Acceleration forces in soil, Development of theoretical equations, Work of different researchers, Similitude in tillage. Traction: Soil linkage, Traction theory, Bokker's contribution, rolling resistance. Deformation and strength of bodies of soil; mechanical properties of the soil materials and the application of the knowledge of these properties to engineering problems: shear strength tests; structure-foundation interaction of earth dams, buildings, embankments, roads, cultivation and the manipulation of the soil to produce an environment which is satisfactory for crop development, drainage and mechanization operations in agriculture.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3712TG	SOIL AND WATER CONSERVATION ENGINEERING
Module Title:	SOIL AND WATER CONSERVATION ENGINEERING
Module Code:	F3712TG
NQF Level	7
Notional hours	160
Contact Hours:	04 Lecture hours / week / semester; 03 Practical hours / week / semester
Additional learning requirements	Field excursions
NQF Credits	16
(Co-requisites)	
Prerequisite	F3701TE
Compulsory/Elective	Compulsory
Semester offered	2

Module content
Soil and water conservation principles, The soil erosion system; Classes, types and forms of soil erosion. Measurements of water erosion and wind erosion. Engineering principles of soil and water conservation: Estimation of Soil Loss, The Universal Soil Loss Equation (USLE), Revised Universal Soil Loss Equation (RUSLE), Modified Universal Soil Loss Equation (MUSLE); erosion control, soil conservation planning. Soil water and nutrient conservation; soil management and reclamation; Methods of estimation of runoff. Ground water recharge and water harvesting, Water Pollution. Standards of Water Quality for Different Uses, National Water Quality Monitoring Programme, Case Study-Watershed Modelling for Soil and Water Conservation and Water Quality; Hydrological Modelling for Future Water Quantity Assessment. Water quality analysis and management. Sediment transport concept. Drainage principles, design of drainage system tiles, ditches, pipes and construction. Design Criteria of Gully Control Structures; Tillage Practices; Waterways, Design of Terraces and other conservation structures, Contour bunds, water ways, stream bank protection. Design of in-situ water harvesting structures, Design, construction and maintenance of earth canals, lined canals, channels. Silt traps and sediment basins. Types of reservoirs/dams. Design criteria – Location of reservoirs, Site investigations (Geological, Soil (texture, hydraulic conductivity, and seepage), Demand, Catchment area, Reservoir volume, Useful life). Design, construction and management of drop boxes, siphons and energy dissipation structures earth ponds, earth dams – stability analysis, seepage, core, anchorage, and spillway. Gender considerations in soil and water conservation engineering. Environmental Impact assessment.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.
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F3742TH PROJECT PLANNING AND MANAGEMENT

Module Title:	PROJECT PLANNING AND MANAGEMENT
Module Code:	F3742TH
NQF Level	8
Notional hours	80
Contact Hours:	02 Lecture hours / week / semester; 02 Practical hours / week / semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	I3601IE
Compulsory/ Elective	Compulsory
Semester offered	2

Module Content
The module includes topics such as: planning process, project cycle, logical framework, financial and economic analysis of project; Project feasibility and appraisal techniques (payback period, the time value of money, Net Present Value, Benefit cost Ratio, and Internal Rate of Return), and sensitivity analysis; Project monitoring and evaluation, leadership, control, and the problems of identifying project costs and benefits and dealing with sustainability in project implementation

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3732TI IRRIGATION AND DRAINAGE DESIGN ENGINEERING

Module Title:	IRRIGATION AND DRAINAGE DESIGN ENGINEERING
Module Code:	F3732TI
NQF Level	7
Notional hours	160
Contact Hours:	04 Lecture hours / week / semester; 03 Practical hours / week / semester
Additional learning requirements	Field excursions
NQF Credits	16
(Co-requisites)	
Prerequisite	F3701TE; F3712TG
Compulsory/Elective	Compulsory
Semester offered	2

Module content
Engineering principles and design of both surface and pressurised irrigation systems, design of surface and subsurface drainage systems including crop water requirements surface irrigation, sprinkler irrigation, drip irrigation, Cropping programme, Soil water balance. Introduction to agro-meteorology Measurement, collection and processing of climatic data. Definition, concepts, measurements and computation of reference (ETo) and crop (ETc). Irrigation: Gross and net irrigation requirement; Irrigation efficiencies; field and scheme water supply. Irrigation depth and interval; real time scheduling; planning irrigation schedules.; Pipe sizing; Pumps; Pump performance; Pump selection; irrigation canals, irrigation wells. Irrigation in arid and semi-arid humid areas. Sources of irrigation water; Type of irrigation systems; Irrigation system planning; Performance of irrigation systems; advantages and limitations; Uniformity of water application; Design standards; Types, system components; Design criteria; automation to irrigation system management; Micro irrigation benefits and problems; Sub irrigation (seepage) systems; Seepage methods; Seepage irrigation process; Design of irrigation structures: systems layout; overhead systems design; micro-irrigation systems design; emission uniformity criteria in designs; pumping stations design; crop-salt tolerance; water quality; leaching requirements; bill of quantities and cost estimates; economic assessment of alternative options; irrigation agronomy; Drainage: Drainage principles types and specifications, design factors, planning and layout, installation, maintenance and machinery requirements. Drainage problems and improvement needs in Namibia. Management of irrigation systems. Gender considerations in planning, design, selection and management of irrigation and drainage systems.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

I3762NH HEAT TRANSFER

Module Title:	HEAT TRANSFER
Module Code	I3762NH
NQF Level	7
Notional Hours	80
Contact hours	2 Lectures + 1 Tutorial and/or 1PS/Week/semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 2

Module Content
Principles: conduction, convection, and radiation. Conduction: Thermal conductivity. Steady state and transient one-dimensional conduction. Forced external Convection: drag and heat transfer in external flows, parallel flow over flat plates and across tube banks. Forced internal Convection: average velocity and temperature, entrance region laminar and turbulent flows. and natural convection: equation of motion and the Grashof number, natural convection over surface. Radiation: Black and grey body thermal radiation. Thermal insulation. Lagging materials. Heat transfer from finned surfaces: fin equation, efficiency, effectiveness. Boiling: pool boiling. Evaporation: film evaporation on the vertical wall. Condensation: film condensation on the vertical wall. Heat exchangers: types, energy balance, analysis, design. Lab practical.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities and a final examination
2. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (At least 3 assignments): 10%
ii) Practical reports (At least 1 practical lab and 1 mini-design project): 15%
iii) Tests (At least 2 tests): 25%

FOURTH YEAR

SEMESTER CORE

F3800TE ENGINEERING ETHICS AND PRACTICE

Module Title:	ENGINEERING ETHICS AND PRACTICE
Module Code	F3800TE
NQF Level	8
Notional Hours	80
Contact hours	2 Lectures + 2 Tutorial or 2PS/Week/semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
The lecturer will present and discuss the following topics with students and use examples and case studies to reinforce the concepts: Engineering Profession Act, 1986 (Act 18 of 1986), as amended in 1991: Categories of engineering professions; procedure and requirements for registration of professional engineers and engineers in training; conduct of practicing engineers, overview of regulations partaking to engineering practice and codes of conduct. Role of Engineering and Agricultural Associations: Engineers Professions Association (EPA); Association of Consulting Engineers in Namibia (ACEN), Namibia National Farmers Union (NNFU), Namibia Agricultural Union (NAU) and Namibia Emerging Commercial Farmers' Union. Statement of Ethical Principles for engineering professionals: Engineering professionals work to enhance the wellbeing of society. In doing so, they are required to maintain and promote high ethical standards and challenge unethical behaviour. Honesty and integrity: Engineering professionals have a duty to uphold the highest standards of professional conduct including openness, fairness, honesty and integrity. Respect for life, law, the environment and public good: Engineering professionals have a duty to obey all applicable laws and regulations and give due weight to facts, published standards and matters of wider public interest. Accuracy and rigour: Engineering professionals have a duty to acquire and wisely use knowledge and skills to perform their roles with care and accuracy in the engineering discipline in which they are currently competent, regularly update their knowledge and skills and present their views objectively and without bias. Leadership and communication: Engineering professionals have a duty to abide by and promote high standards of leadership and communication, promote public awareness and understanding of the impact and benefits of engineering and be objective and truthful in any statement made in their professional capacity.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:
i) Assignments (At least 3 assignments): 40%
ii) Tests (At least 3 tests): 60%
4. No Examination
5. To pass this course a student should obtain a minimum final mark of 50%.

F3820TI INDUSTRIAL ATTACHMENT

Module Title :	INDUSTRIAL ATTACHMENT
Module Code:	F3820TI
NQF Level	8
Notional hours	160
Total Hours:	Six (6) hours/day x 5 days/week) x 6 weeks
Additional learning requirements	None
NQF Credits	
(Co-requisites)	

Prerequisite	None
Compulsory/ Elective	Compulsory
Semester offered	1

Module content
Industrial Attachment: students will work under company supervision at the level of Technologist. Trainee and will undertake at least six months of attachment at an appropriate industry for hands-on practical training. Students will maintain a logbook of daily activities and will be required to submit a comprehensive final report for assessment at the beginning of the following semester. Students will be visited at their workplaces by their Lecturers at least once during attachment.

Student Assessment Strategies
1. Students will be assessed through continuous assessments activities
2. The final mark will be made of 100% Continuous Assessment
3. The Continuous Assessment will be made up of the following assessment activities:

i) Daily Logbook Record: 20%
ii) Lecturer/Employer, Evaluation: 20%
iii) Final Report -Written report and presentation: 60%

F3840TR RESEARCH PROPOSAL AGRICULTURAL ENGINEERING

Module Title:	RESEARCH PROPOSAL AGRICULTURAL ENGINEERING
Module Code	F3840TR
NQF Level	8
Notional Hours	80
Contact hours	2 hours lectures / week/ semester; 2 hour tutorial sessions / week / semester
Additional learning requirements	None
NQF Credits	8
(Co-requisites)	
Prerequisite	F3710TA
Compulsory/Elective	Compulsory
Semester Offered	Semester 0

Module Content
Research Proposal: Written proposal, and oral presentation; Seminars: Departmental seminar (at least one) as determined by the Departmental students' research committee; Final Presentation: At least a 15 minute oral presentation of the research results; Final Report: Full Report-Literature review relevant to the problem, methodology.

Student Assessment Strategies
The modules will be assessed by means of continuous assessment only weighted as follows:
Proposal presentation 10%, marked proposal report 10%, At least one seminar presentation 10 %, Final research presentation 20%, Final report write-up 50%. Pass mark for the module is 50%.

SEMESTER ONE

F3821TE RENEWABLE ENERGY AND APPROPRIATE TECHNOLOGY

Module Title:	RENEWABLE ENERGY AND APPROPRIATE TECHNOLOGY
Module Code:	F3821TE
NQF Level	8
Notional hours	80
Contact Hours:	02 Lecture hours / week / semester; 02 Practical hours / alternate week / semester
Additional learning requirements	Field excursions
NQF Credits	8
Pre-requisite(s):	13502EE
Compulsory/ Elective	Compulsory
Semester offered	2

Module content
Current energy demands: environmental effects, Conventional & non-conventional energy sources in farm, forms of energy; Energy: Africa & World; Engineering intervention for production and productivity; Merits and limitations of different power sources; classification; Energy farming. Fundamentals of various sources of renewable energy and their applications renewable energy resources: concentrated solar plant (CSP), thermal solar, wind, hydro, geothermal, bioenergy, magneto-hydrodynamics (MHD), tidal, ocean thermal and wave energies. Solar (thermal and photovoltaic), fuel cells, hydroelectric, bio-energy, wind energy, tidal power, wave energy, geothermal energy, ocean thermal, heat pump systems. Wind Power generation. Construction of simple solar arrays for energy production. Comparison between renewable and nuclear energy. Mixture of energy sources. Smart grid technology. Power station economics. Sustainable development. Greenhouse gases. Energy efficiency. Biomass and Biogas: design of biogas plants, Fuels; Fermentation process for ethanol production, combustion chemistry, pre-mixed combustion, diffusion flames, induction and exhaust processes, Gasifiers, types and it's working ; Solar energy, solar constant ,Determination of solar time, measurement of solar radiation; Solar air collector, solar concentrator, Evacuated -tube collector; Solar Thermal energy application ; Solar water heating system, solar cooker; Solar pond, solar crop drying, solar house; Solar photovoltaic application: photovoltaic effect, material, course, cell temperature and its application; Wind energy, Potential, basis concept of lift and drag; Measurement of various types of wind mills and their application; design of renewable energy technologies and management: Economic aspects of energy planning.

Student assessment strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3811TS	STORAGE AND PROCESSING OF AGRICULTURAL PRODUCTS
Module Title:	STORAGE AND PROCESSING OF AGRICULTURAL PRODUCTS
Module Code:	F3811TS
NQF Level	8
Notional hours	160
Contact Hours:	04 Lecture hours / week / semester; 03 Practical hours / week / semester
Additional learning requirements	Field excursions
NQF Credits	16
(Co-requisites)	
Prerequisite	F3771TD
Compulsory/ Elective	Compulsory
Semester offered	1

Module Content
Fundamentals of postharvest technology and agro-processing. Agricultural Process Engineering. Postharvest handling in relation to final product quality; Intrinsic and extrinsic factors; Food waste vs. losses, types of losses; Postharvest system, Physical and Chemical Structure of Agricultural products; Physiology of respiration; Maturity Indices; Fruit maturation and development, senescence processes. Causes of losses e.g. physiological changes, mechanical damage, pests and diseases. Equipment for drying processing and storage. Conservation techniques for horticultural crops. Principles of drying: psychometry – Drying curves –Heat and mass transfer in dryers. Drying models – Drying methods and types of dryers. Agricultural Equipment used for Processing of agricultural crops: Threshers. Grinders, cutters, mixers, residue disposers, Shellers. Millers. Threshing and shelling efficiency Oil Expressers Rice threshers. Equipment for Handling and storage of horticultural and perishable Crops: Handling system and environment Material handling equipment: Material movement into and within storage structures for large scale structures: Folk lift, Screw conveyor, Belt conveyor, Bucket elevator, Pneumatic conveyors. Farm transport, materials handling and processing structures and equipment. Design of Agricultural Processing Engineering and Food Engineering. Storage: Storage principles, Types of farm storage structures: Silos, sheds, warehouses and open stacks, bunkers, Management of storage facilities. Stacking and movement of commodities. Storage losses including loss assessment methods and control measures. Pre-treatments of horticultural produce; Packaging, storage and transportation; System Designs of packinghouse, Storage structures and equipment; Design of handling equipment in relation to product characteristics; Flow processes diagram, Computer aided design in postharvest processes. Construction and management of and storage structures; Quality evaluation and grading: Chemical quality indices and evaluation; Physical quality evaluation (colour, texture); Shelf-life evaluation of fresh produce; Non-destructive quality evaluation. Application of Heat and mass transfer as applied to food and crop processing (Modes of heat transfer, governing equation and boundary conditions of heat transfer; Heat and mass balances, Heat exchangers); Air properties and psychometry: Moisture content, equilibrium moisture content and moisture sorption isotherms; Crop processing engineering: handling, cleaning, sorting, grading, milling, separating, pre-cooling and packaging.

Student Assessment Strategies
This module will be assessed using both formative and summative assessment, with the formative assessment contributing 50% to the final mark while the summative assessment would contribute 50%. The formative assessments will include at least 2 assessed written assignments, at least 3 practical reports and a minimum of 2 written tests. The summative assessment will comprise a written end of semester examination (1 x 3-hour paper). The pass mark for the module is 50%.

F3821TP	RESEARCH PROJECT
Module Title:	RESEARCH PROJECT
Module Code:	F3821TP
NQF Level	8
Notional hours	160
Contact Hours:	16 hours of Research Work per week + Seminar Presentations + report writing
Additional learning requirements	Field excursions
NQF Credits	16
(Co-requisites)	
Prerequisite	All third-year modules
Compulsory	Compulsory
Semester offered	1 & 2

Module content
Execution of research project: A project of an investigation nature carried out either as an individual or as member of a small team, involving research, literature search, data collection, analysis and presentation. Students will be taught scientific writing that can be useful for their further study and academic publications. Seminars: The module will have at least three presentations of the research work to the panel.Departmental seminar (at least one) as determined by the Departmental students' research committee; Final Presentation: At least a 15 minute oral presentation of the research results The presentation, in the form of a dissertation, is expected to include necessary technical information and to be in accordance with relevant codes of practice and guidelines for Scientific Writing, Final Report: Full Report-Literature review relevant to the problem, methodology, results for each objective, discussion, conclusion and recommendation.Students will also be encouraged to publish their findings after completing the course.

Student Assessment Strategies
Continuous Assessment 100% (Progress report presentation 20%; Final Oral Presentation of Research Report 20%; Final Research Report 60%).

F3813TD	AGRICULTURAL ENGINEERING DESIGN PROJECT
Module Title:	AGRICULTURAL ENGINEERING DESIGN PROJECT
Module Code:	F3813TD
NQF Level	8
Notional hours	160
Contact Hours:	14 hours of Research Work per week + Seminar Presentations + report writing
Additional learning requirements	Field excursions
NQF Credits	16
Assessment	
(Co-requisites)	
Prerequisite	All 3rd Year Courses
Compulsory/ Elective	Compulsory
Semester offered	1 & 2

Module Content
This module provides students with opportunities to exercise and demonstrate their ability to co-ordinate their knowledge, experience and judgment in addressing major agricultural engineering design projects and presenting their proposed solutions in a concise technical manner. Introduction to agricultural engineering design: problem definition and design specification information search, idea generation and development of design concepts. Design techniques and profit management methods, safety, cost estimating, and project scheduling. Time management, patents, engineering design as an iterative, parallel activity process. Understanding design as a pragmatic combination of scientific theory, technical skills, people talents and art to create solutions to problems. Philosophy of design: Components of design. Design process: major agricultural engineering design projects Modelling Software to make master model, 2D manufacturing drawing from master model. The students will be assisted to go through the practical design process, fabrication and testing of prototypes. The designs should be accompanied with manual and/or computer-generated engineering drawings or computer source codes consistent with professional engineering practice. The design process will be conducted under the guidance of a supervisor, Prototype of chosen final design produced: Intellectual property rights and patent development, Fitness of product is conducted.

Student Assessment Strategies
Continuous Assessment: (100% (Two Seminar Presentations of design (20%); Final Oral Presentation of Design Report (20%); Final Design Report (60%)]

SEMESTER 2

F3812TM	FARM MACHINERY AND IMPLEMENT DESIGN
Module Title:	FARM MACHINERY AND IMPLEMENT DESIGN
Module Code:	F3812TM
NQF Level	8
Notional hours	160
Contact Hours:	04 Lecture hours / week / semester; 03 Practical hours / week / semester
Additional learning requirements	Field excursion
NQF Credits	16
(Co-requisites)	
Prerequisite	F3771TD
Compulsory/Elective	Compulsory
Semester offered	2

Module Content
Introduction to the engineering design, problem definition and design specification information search, idea generation and development of design concepts. Design techniques and profit management methods, safety, cost estimating, and project scheduling. Time management, patents, engineering design as an iterative, parallel activity process. Understanding design as a pragmatic combination of scientific theory, technical skills, people talents and art to create solutions to problems. Philosophy of design. Components of design. Agricultural machines; types, design and functional requirements. Engineering materials. Stress and deflection analysis. Theories of failure. Design against failure. Detachable fasteners. Power screws. Shafting design. Mechanical power transmission: gear drives, belt drives, chain drives, ropes and hoists, springs. Bearings, welding, brakes, clutches and couplings. Vibrations. Design process, Modelling Software to make master model, 2D manufacturing drawing from master model. Group/Team makes new components using structures design methodology. Design to conform to specific criteria (cost, quality, safety, durability and function), Generate 3D Digital Mock-ups and 2D manufacturing drawings using 3D CAD Modelling software. Prototype of chosen final design produced. Intellectual property rights and patent development, Fitness of product is conducted. Signal conditioning, analog devices, data acquisition and sampling, fundamental sensor applications and controls.

Student assessment strategies
The assessment will be 100% Continuous constituting of the following: Two Seminar Presentations of design (20%); Final Oral Presentation of Design Report (20%); Final Design Report (60%)]
To pass this module a student should obtain a minimum final mark of 50% and also meets the ECN exit level outcome 1, 3, 6

F3812TF FARM STRUCTURES PLANNING AND DESIGN

Module Title:	FARM STRUCTURES PLANNING AND DESIGN
Module Code:	F3812TF
NQF Level	8
Notional hours	160
Contact Hours:	04 Lecture hours / week / semester; 03 Practical hours / week / semester
Additional learning requirements	Field excursion
NQF Credits	16
(Co-requisites)	
Prerequisite	13651VM
Compulsory/Elective	Compulsory
Semester offered	2

Module content

Introduction to agricultural structures ; Developments in farm structures, Design characteristics of buildings and economic feasibility; Farmstead planning and layout; Map reading, measuring and levelling techniques, Site selection; Building arrangement in relation to other structures and farm; Types and properties of building materials; Selection of materials in relation to use; Steel, Wood, Concrete , Masonry, Metals, Plastic, Bricks, Manufactured boards, and other materials; Types of structural frames. Estimating loads, Types of loads on buildings; Stress analysis. Introduction to structural design: - philosophy of design; Elastic and plastic design concepts. Reinforced concrete design. Design for axial loadings. Components of farm structures; Building Footings, foundations, Walls, and floor, of beams, slab, columns, trusses, frames, connections and joints, roofs. Computer concept for improved analysis and design. Design project. Design and construction of agricultural structures – Drying and storage structures for different agricultural farm products and food storage structures, Specialized farm structures, family housing, Livestock housing units, Poultry units, dairy, piggery unit, Greenhouses, Farm workshop, Machinery storage, Fuel and chemical storage, Handling facilities for cattle, dairy, poultry and piggery. Management, Care and maintenance of different farm structures. Economic feasibility of farm buildings, Bills of quantities, estimating materials and cost of constructing various structures, Planning, layout, costing and construction of farm buildings. Ventilation in farm buildings and farm electricity, Waste management, Environmental consideration in design - Heat transfer, thermal resistance and solar heat load.

Student Assessment Strategies

The assessment will be 100% Continuous constituting of the following: Two Seminar Presentations of design (20%); Final Oral Presentation of Design Report (20%); Final Design Report (60%)]
To pass this module a student should obtain a minimum final mark of 50% and also meets the ECN exit level outcome 1, 3, 6

F3821TP RESEARCH PROJECT

Module Title:	RESEARCH PROJECT
Module Code:	F3821TP
NQF Level	8
Notional hours	160
Contact Hours:	16 hours of Research Work per week + Seminar Presentations + report writing
Additional learning requirements	Field excursions
NQF Credits	16
(Co-requisites)	
Prerequisite	All third-year modules
Compulsory	Compulsory
Semester offered	1 & 2

Module content

Execution of research project: A project of an investigation nature carried out either as an individual or as member of a small team, involving research, literature search, data collection, analysis and presentation. Students will be taught scientific writing that can be useful for their further study and academic publications. Seminars: The module will have at least three presentations of the research work to the panel.Departmental seminar (at least one) as determined by the Departmental students' research committee; Final Presentation: At least a 15 minute oral presentation of the research results The presentation, in the form of a dissertation, is expected to include necessary technical information and to be in accordance with relevant codes of practice and guidelines for Scientific Writing, Final Report: Full Report-Literature review relevant to the problem, methodology, results for each objective, discussion, conclusion and recommendation.Students will also be encouraged to publish their findings after completing the course.

Student Assessment Strategies

Continuous Assessment 100% (Progress report presentation 20%; Final Oral Presentation of Research Report 20%; Final Research Report 60%).

F3813TD AGRICULTURAL ENGINEERING DESIGN PROJECT

Module Title:	AGRICULTURAL ENGINEERING DESIGN PROJECT
Module Code:	F3813TD
NQF Level	8
Notional hours	160
Contact Hours:	14 hours of Research Work per week + Seminar Presentations + report writing
Additional learning requirements	Field excursions
NQF Credits	16
Assessment	
(Co-requisites)	

Prerequisite All 3rd Year Courses
Compulsory/ Elective Compulsory
Semester offered 1 & 2

Module Content
This module provides students with opportunities to exercise and demonstrate their ability to co-ordinate their knowledge, experience and judgment in addressing major agricultural engineering design projects and presenting their proposed solutions in a concise technical manner. Introduction to agricultural engineering design: problem definition and design specification information search, idea generation and development of design concepts. Design techniques and profit management methods, safety, cost estimating, and project scheduling. Time management, patents, engineering design as an iterative, parallel activity process. Understanding design as a pragmatic combination of scientific theory, technical skills, people talents and art to create solutions to problems. Philosophy of design: Components of design. Design process: major agricultural engineering design projects Modelling Software to make master model, 2D manufacturing drawing from master model. The students will be assisted to go through the practical design process, fabrication and testing of prototypes. The designs should be accompanied with manual and/or computer-generated engineering drawings or computer source codes consistent with professional engineering practice. The design process will be conducted under the guidance of a supervisor, Prototype of chosen final design produced: Intellectual property rights and patent development, Fitness of product is conducted.

Student Assessment Strategies
Continuous Assessment: (100% (Two Seminar Presentations of design (20%); Final Oral Presentation of Design Report (20%); Final Design Report (60%)]

E.2.4.3 BACHELOR OF SCIENCE IN AGRONOMY (HONOURS)

ADMISSION REQUIREMENTS

To qualify for entry into the Bachelor of Science in Agronomy (NQF Level 8) Honours, the applicant must be in possession of either:

- A Bachelor of Science degree in Crop Production (NQF level 7) from the University of Namibia.
  Or
- An equivalent qualification from a recognized institution of higher education.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4810EP	Research Proposal	8	14	(2L/wk)	None	C
F3880AD	Design thinking	8	8	(2L/wk)	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4893CA	Research Project in Agronomy	8	8	(L(2hr/wk)	F4830CD	C
F4821TB	Formal Seed Systems	8	20	L(4hr/wk), P(3hr/alt.wk)	None	C
F4881CL	Field, Industrial and Forage Crop Production	8	20	L(4hr/wk), P(3hr/alt.wk)	None	C
F4822CM	GIS and Remote Sensing	8	10	(L (2hr /wk), P(3hr/wk)	None	C
TOTAL Semester I						**58**
Year 1: Semester 2						
F4893CA	Research Project in Agronom	8	8	(L(2hr/wk)	F4830CD	C
F4812CF	Plant Biotechnology	8	20	L(4hr/wk), P(3hr/wk)	None	C
F4832CP	Climate-Smart Agriculture	8	20	L(4hr/wk), P(3hr/alt.wk)	None	C
F4822CQ	Crop handling and Storage	8	10	L(2hr/wk), P(3hr/alt.wk)	None	C
Total Credits Semester 2						**58**
Total credits for YEAR 1						**138**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F3880AD DESIGN THINKING

Module Title:	Design Thinking
Module Code	F3880AD
NQF Level	8
Notional Hours	80

Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The module aims to develop critical thinking and problem-solving skills. To develop interdisciplinary thought, problem structuring and design thinking skills, inculcating innovation, concept development, applied creativity, prototyping and experimentation.

Module Content

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Learning and Teaching Strategies/Activities

- Lectures: A blended learning mode will be used
- Group discussions & presentations: Students will be assigned some tasks in a group to enhance communication and team work skills. Some tasks will be assigned in groups for oral presentations in order to enhance critical thinking & presentation skills.
- Expand according to the programme.

Student Assessment Strategies

- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F4810EP RESEARCH PROPOSAL

Module Title:	Research Proposal
Module Code	F4810EP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

This module introduces research process and enable students to produce a research proposal ready for implementation. The module focuses on specific aspects of doing research including: identifying research gaps through stating the research problem, framing the research question and determining research approaches and designs; and ethical issues, reviewing literature that links to the research objectives and critical appraisal; reference management.

Module Content

Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies

The assessment will include:

The module is based on 100% continuous assessment and the final mark will be calculated as follows:

- Module assessment quizzes (20%)
- Proposal report (50%)
- Proposal presentation (20%)
- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)
- A minimum mark of 50% needs to be achieved in order to pass the module

Semester 1:

F4893CA	RESEARCH PROJECT IN AGRONOMY
Module Title:	Research Project in Agronomy
Course Code	F4893CA
NQF Level	8
Notional Hours	160
Additional learning requirements	None
Contact Hours	2Lecture hours per week
NQF Credits	16
Prerequisite	Research Proposal and Quantitative Methods in Agribusiness and Economics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course allows the students to undertake independent academic research in Agronomy and produce a scientific report.

Module Content

Research Proposal: Written proposal (Agronomy); and oral presentation. Seminars: Departmental seminars (at least one) are determined by the Departmental students' research committee. Final Presentation: At least a 15-minute oral presentation of the research results. Final Project Report: Literature review relevant to the problem; methodology; results for each objective; discussion; conclusion and recommendation.

S**tudent Assessment Strategies**

The module assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Research Proposal Presentation - 10%
- Research proposal Report - 10%
- At least one seminar presentation-10 %
- Research project presentation - 20%
- Research project report - 50%

A minimum mark of 50% needs to be achieved in order to pass the module.

F4821TB	FORMAL SEED SYSTEMS
Module Title:	Formal Seed Systems
Course Code	F4821TB
NQF Level	8
Notional Hours	200
Additional learning requirements	Compulsory field excursions (outside the normal practical)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module's purpose is to help students understand the significance of improved seeds for human development and the application of scientific principles and practices to the production of high-quality seeds..

Module Content

Importance of quality seed in socio-economic development. **Review of cultivar development**: selection methods, variety evaluation and release. **Types of cultivars**: Pure lines, hybrids, synthetics, open-pollinated populations. **DUS-test**. **Seed ecology**: Review of plant growth and seed development, growth factors affecting seed quality. **Seed germination**: Conditions for germination, seed dormancy. **Seed multiplication**: Organisation, suitable areas, and agronomy. **Harvesting and threshing**: Harvesting time and methods, and threshing methods. **Processing**: Drying, cleaning, treatment, grading. **Storage**: Packaging, storage facilities, conditions, and factors affecting storage life. **Seed quality control**: legislation, certification, inspection, testing. **Marketing and distribution of seeds**: Demand forecasting, supply and pricing. **Seed production of essential crops of Namibia:** Pearl millet, maize, sorghum, and cowpea. **Field Excursion:** Before classes end, students will undertake field trips to local seed production, processing, and marketing entities as well as to national genetic resource centres to appreciate the seed value-chain industry.

Student Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, at least 5 practicals and Term Project). Examination: 60% (01 x 03 hours paper)

F4882CM	GIS AND REMOTE SENSING
Module Title:	GIS and Remote Sensing
Course Code	F4882CM
NQF Level	8

Notional Hours	100
Additional learning requirements	Field trips are required for GPS exercises and ground truth data collection. Lab-based spatial data analysis and group work
Contact Hours	2 Lecture hours per week 3 Practical hours per week
NQF Credits	10
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: Introduce students to GIS and remote sensing (RS), GIS and RS software, spatial data formats, data analysis, and manipulations for developing base maps in different applications.

Module Content:

Basic concepts in GIS and RS: Introductions to GIS, GPS and RS. Introductions to GIS and RS software: Introduce students to different GIS and RS software such as QGIS, R, ILWIS (open source), ArcGIS, and ENVI. (commercial). Spatial data processing and analysis techniques: Introduce students to Spatial Data Structures (SDS), Introduction to spatial data collection using GPS, Integrating GPS data into GIS, integrating spatial data from different sources, Geo-database development and maintenance, weighted overlay functions in GIS, Defining spatial references, coordinate systems and projections and apply relevant transformations for data integration. Basic cartography and geo-visualisation: the relationship between visualisation and cartography, digital map visualisation, visual representation of spatial data. Basic aerial photograph: Introduction to the concepts of aerial photographs, different types of aerial photography, features of aerial photographs, visualisation, processing and analysis of aerial photographs. Digital image processing techniques: Image interpretation, principal component analysis, layer stacking, mosaicking, masking, image classification. Applications of GIS and remote sensing: Introduce students to GIS and RS in Agricultural Crop Production and Land Management. Field Excursion: Before classes end, students will undertake a one-day field trip to nearby crop farms for GIS application.

Student Assessment strategies

Student assessment for this course will consist of formative and summative tasks. Formative assessments will make up 50% of the course grade (i.e. 2 assessed practicals [20%], 2 tests [40%] and 2 assignments: (assessed as written [20%] and seminar presentation [20%]) and a summative assessment (end of semester examination) 50% (1x 3 hours theory paper). The pass mark for the module is 50%.

F4881CL FIELD, INDUSTRIAL AND FORAGE CROP PRODUCTION

Module Title:	Field, Industrial and Forage Crop Production
Course Code	F4881CL
NQF Level	8
Notional Hours	200
Additional learning requirements	Compulsory field excursions (outside the normal practical)
Contact Hours	4 Lecture hours per week 3 Tutorial hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: Introduce students to GIS and remote sensing (RS), GIS and RS software, spatial data formats, data analysis, and manipulations for developing base maps in different applications.

Module Content

Importance of forages to African pastureland production: The seven essential roles forages play in Soils-Crops-Livestock agriculture. Categories of pastureland production: Based on rainfall and resource control. The environmental agronomy of communal range and farm pastures. The four stockman's categories. Desirable attributes of cultivated forages. Feed crop types: Hay (Grass-legume), silages, grain, crop residue and their nutritive quality. Forage management: Inventory plan, crop production plan, Crop budget plan, and nutrient management plan. Management of natural pastures: Based on the classical Mott's curve. Field Excursion: Before classes end, students will undertake a one-week field trip to visit various intensive crop production entities in Tsumeb, Otjiwarongo, Grootfontein and Okahandja.

Learning and Teaching Strategies/Activities

E-learning, Lectures, practicals, written assignments, fieldwork, group work, class discussions and presentations.

Student Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, at least 5 practicals). Examination: 60% (1 x 03 hours paper).

F4812CF PLANT BIOTECHNOLOGY

Module Title:	Plant Biotechnology
Course Code	F4812CF
NQF Level	8
Notional Hours	200
Additional learning requirements	Compulsory field excursions (outside the normal practical)

Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

This module develops students' understanding and skills regarding plant biotechnology, both to produce improved crops using novel methods and to offer effective biosafety to policymakers and the public.

Module Content

Introduction: What is biotechnology? Definition of important terms, application of biotechnology in crop improvement, advantages and disadvantages. Plant tissue culture, Lab facilities and operations, Equipments and apparatus, Tissue Culture Media, Plant growth regulators, Establishing aseptic cultures, Plant Tissue Culture Techniques, Quantitative and Qualitative Improvement, Cell differentiation, Micropropagation by adventitious and Axillary Shoot Proliferation. Meristem Culture for Virus Elimination, Establishment of pathogen free plants, In-vitro meristem and shoot-tip culture, Virus indexing, Somatic Embryogenesis and Artificial Seed Production, In-vitro somatic embryogenesis, Organogenesis, Production of synthetic seeds, Applications and Limitations of somatic embryogenesis. Doubled Haploid Production, Androgenesis, Anther and Pollen culture, Gynogenesis, Diploidization of haploids, Applications of haploid production, Triploid Production by Endosperm Culture, Factors controlling callus proliferation and plant regeneration, Shoot regeneration, Histology, Cytology. Cell Suspension Cultures, History and evolution, Plant cell cultures vs. microbial cultures, Protoplast Isolation and Regeneration, Protoplast culture techniques, Somatic Hybridization and Cybridization, Protoplast fusion, Cybrids, Applications and Limitations of somatic hybridization, Somaclonal, Protoclonal and Gametoclonal Variation, Analysis of Somaclonal variants, Applications and Limitations of Somaclonal variations. Cloning Vectors, types and sequences of vectors, Gene Cloning and Methods of Gene Transfer, Bacterial Transformation methods and selection of recombinant clones, Transgenic technology, biosafety issues, role of transgenics in bioremediation. Cryopreservation, In-situ and Ex-situ methods, Steps involved in cryopreservation, advantages and disadvantages of in-vitro preservation. Molecular marker technology, types of markers, advantages and disadvantages, Application of molecular markers in crop improvement, genome editing and its tools. Field Excursion: Before classes end, students will undertake a one-week field trip to visit a biotechnology laboratory in Windhoek, or Swakopmund to appreciate their operations.

Student Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, at least 5 Practicals). Examination: 60% (1 x 03 hours paper).

F4832CP CLIMATE-SMART AGRICULTURE

Module Title:	Climate-Smart Agriculture
Course Code	F4832CP
NQF Level	8
Notional Hours	200
Additional learning requirements	Excursions (visits to relevant farms for exposure)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The module develops the student's conceptualization and skills in climate-smart agriculture, a tool for responding to the effects of climate change.

Module Content

Introduction to Climate-Smart Agriculture: concept of Climate-Smart Agriculture; Importance of CSA in addressing climate change and ensuring food security; Key principles of CSA: productivity, adaptation, mitigation. Climate Change and Agriculture: Overview of climate change: causes, impacts, and projections; Implications of climate change for global and local agriculture; Vulnerabilities of different agricultural systems to changing climatic conditions. Adaptation Strategies in Agriculture: electing climate-resilient crop varieties and livestock breeds; Water management techniques for variable and changing precipitation patterns; Soil management practices to enhance fertility and water retention; Agroforestry and biodiversity enhancement for increased resilience. Mitigation Strategies in Agriculture: Low-carbon and efficient farming practices; Conservation agriculture: reduced tillage, cover cropping, and crop rotation; Methane and nitrous oxide emission reduction from livestock and fertilisers; Renewable energy integration in agriculture.

Sustainable Farming Systems: Integrated pest management (IPM) and disease control. Diversification of crops and income sources; Value addition and postharvest management to reduce losses; Community-based approaches to climate adaptation and mitigation.

Policy and Finance for CSA: Government policies and incentives for promoting CSA. International agreements related to climate and agriculture (e.g., Paris Agreement), Accessing funding and financial mechanisms for CSA projects. Monitoring and Evaluation of CSA Practices: Indicators for assessing the effectiveness of CSA interventions; Data collection and analysis techniques for tracking climate impacts; Case studies showcasing successful CSA implementation. Case Studies and Success Stories: Showcasing real-world examples of CSA implementation, Highlighting the positive outcomes and impacts on livelihoods, Lessons learned, and best practices from different regions. Future Directions in CSA: Emerging technologies for climate-resilient agriculture; Innovations in breeding, crop protection, and resource management; Shaping policies and

strategies for long-term sustainability. Field Excursion: Before classes end, students will undertake a one-week field trip to visit crop production entities in Tsumeb, Otavi and Grootfontein.

Student Assessment Strategies

- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper).
- A student must obtain a minimum final mark of 50% to pass this module.

F422CQ CROP HANDLING AND STORAGE

Module Title:	Crop Handling and Storage
Course Code	F422CQ
NQF Level	8
Notional Hours	100
Additional learning requirements	Excursions (visits to relevant farms for exposure)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	10
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

This module presents in-depth knowledge of crop postharvest systems, handling techniques, and storage management. Its purpose is to evaluate crop properties and select the appropriate postharvest handling, processing, and storage methods required for crop loss reduction.

Module Content

The Postharvest system: postharvest systems for various crops, crop flow in postharvest and handling, crop harvesting, timing, maturity indices and selection of appropriate harvesting methods. Crop treatments: precooling, waxing, ripening, sorting, and grading. Crop loss identification: classification of losses, causes and agents of produce loss, losses at progressive stages in the postharvest system, and loss assessment methods. Properties of crop commodities: physical, mechanical, grain structure, nutritional composition, moisture in grain, moisture behaviour in grain bulk/stacks, respiration and thermal properties of crops affect their storage and handling. Grain sampling: rationale of sampling, bulk and bag methods, composite and working samples.

Moisture content determination; Direct and indirect methods; moisture meter calibration. Crop drying. Energy requirements for drying. Natural drying, Artificial drying, Psychometrics. Equilibrium moisture relationships. Drying methods, types and maintenance of driers: Safe drying temperatures. Handling and storing perishable crops: Causes of losses, e.g., physiological changes, mechanical damage, pests and diseases. Quality assessment techniques for horticultural crops. Material handling equipment: Material movement into and within storage structures for large-scale structures; folk lifts, screw conveyors, belt conveyors, bucket elevators, and pneumatic conveyors. Processing crops: Threshing includes rice threshing, shelling, milling, oil expression, and threshing and shelling efficiency. Storage: Types of farm storage structures: Silos, sheds, warehouses, open stacks, and bunkers. Management of storage facilities. Stacking and movement of commodities. Review the biology of storage pests, pest infestation and control of storage insect pests.

Student Assessment Strategies

- Continuous assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper).
- A student must obtain a minimum final mark of 50% to pass this module.

E.2.4.4 BACHELOR OF SCIENCE IN CROP IMPROVEMENT AND SEED SYSTEMS HONOURS (LEVEL 8)

ADMISSION REQUIREMENTS

To qualify for entry into the Bachelor of Science in Crop Improvement and Seed Systems Honours (NQF Level 8), the applicant must be in possession of either:

- A Bachelor of Science in Crop Production (NQF Level 7) from the University of Namibia.

Or

- An equivalent qualification from a recognized institution of higher education.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4810EP	Research Proposal	8	14	(2L/wk)	None	C
F3880AD	Design thinking	8	8	(2L/wk)	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4833CI	Research Project in Crop Improvement and Seed Systems	8	8	L (2h/wk)	F4830CD	C
F4821TB	Formal Seed Systems	8	20	L(4hr/wk), P(3hr/alt.wk)	None	C
F4821TC	Orphan Crop Germplasm Enhancement	8	10	L (2h/wk); P (3h/alt.wk)	None	C
F4811TD	Plant Breeding	8	20	L (4h/wk); P (3h/wk	None	C
TOTAL Semester I						**58**
Year 1: Semester 2						
F4833CI	Research Project in Crop Improvement and Seed Systems	8	8	(L(2hr/wk)	F4830CD	C
F4812CF	Plant Biotechnology	8	20	L(4hr/wk), P(3hr/wk)	None	C
F4832TG	Molecular Genetics	8	20	L (4h/wk); P (3h/wk)	None	C
F4802TH	Bio-safety Measures in Crop Improvement	8	10	L (2h/wk); P (3h/alt.wk)	None	C
Total Credits Semester 2						**58**
Total credits for YEAR 1						**138**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F3880AD	DESIGN THINKING
Module Title:	Design Thinking
Module Code	F3880AD
NQF Level	8
Notional Hours	80
Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The module aims to develop critical thinking and problem-solving skills. To develop interdisciplinary thought, problem structuring and design thinking skills, inculcating innovation, concept development, applied creativity, prototyping and experimentation.

Module Content

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Learning and Teaching Strategies/Activities

- Lectures: A blended learning mode will be used
- Group discussions & presentations: Students will be assigned some tasks in a group to enhance communication and team work skills. Some tasks will be assigned in groups for oral presentations in order to enhance critical thinking & presentation skills.
- Expand according to the programme.

Student Assessment Strategies

- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F4810EP	RESEARCH PROPOSAL
Module Title:	Research Proposal
Module Code	F4810EP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

This module introduces research process and enable students to produce a research proposal ready for implementation. The module focuses on specific aspects of doing research including: identifying research gaps through stating the research problem, framing the research question and determining research approaches and designs; and ethical issues, reviewing literature that links to the research objectives and critical appraisal; reference management.

Module Content

Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies

The assessment will include:

The module is based on 100% continuous assessment and the final mark will be calculated as follows:

- Module assessment quizzes (20%)
- Proposal report (50%)
- Proposal presentation (20%)

- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)
- A minimum mark of 50% needs to be achieved in order to pass the module

Semester 1:

F4833CI	RESEARCH PROJECT IN CROP IMPROVEMENT AND SEED SYSTEMS
Module Title:	Research Project in Crop Improvement and Seed Systems
Course Code	F4833CI
NQF Level	8
Notional Hours	160
Additional learning requirements	None
Contact Hours	2Lecture hours per week
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course allows the students to undertake independent academic research in Crop Improvement and Seed Systems and produce a scientific report.

Module Content

Research Proposal: Written proposal (Agronomy) and oral presentation. Seminars: Departmental seminars (at least one) are determined by the Departmental students' research committee. Final Presentation: At least a 15-minute oral presentation of the research results. Final Report: Full Report-Literature review relevant to the problem; methodology; results for each objective; discussion; conclusion and recommendation.

Student Assessment Strategies

The module assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Research proposal Presentation - 10%
- Research proposal Report - 10%
- At least one seminar presentation 10 %
- Research project presentation - 20%
- Research project report - 50%
- A student must obtain a minimum final mark of 50% to pass this module.

F4821TB	FORMAL SEED SYSTEMS
Module Title:	Formal Seed Systems
Course Code	F4821TB
NQF Level	8
Notional Hours	200
Additional learning requirements	Compulsory field excursions (outside the normal practical)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module's purpose is to help students understand the significance of improved seeds for human development and the application of scientific principles and practices to the production of high-quality seeds..

Module Content

Importance of quality seed in socio-economic development. **Review of cultivar development**: selection methods, variety evaluation and release. **Types of cultivars**: Pure lines, hybrids, synthetics, open-pollinated populations. **DUS-test**. **Seed ecology**: Review of plant growth and seed development, growth factors affecting seed quality. **Seed germination**: Conditions for germination, seed dormancy. **Seed multiplication**: Organisation, suitable areas, and agronomy. **Harvesting and threshing**: Harvesting time and methods, and threshing methods. **Processing**: Drying, cleaning, treatment, grading. **Storage**: Packaging, storage facilities, conditions, and factors affecting storage life. **Seed quality control**: legislation, certification, inspection, testing. **Marketing and distribution of seeds**: Demand forecasting, supply and pricing. **Seed production of essential crops of Namibia:** Pearl millet, maize, sorghum, and cowpea. **Field Excursion:** Before classes end, students will undertake field trips to local seed production, processing, and marketing entities as well as to national genetic resource centres to appreciate the seed value-chain industry.

Student Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, at least 5 practicals and Term Project). Examination: 60% (01 x 03 hours paper)

F4821TC	ORPHAN CROP GERMPLASM ENHANCEMENT
Module Title:	Orphan Crop Germplasm Enhancement
Course Code	F4821TC
NQF Level	8
Notional Hours	100
Additional learning requirements	Field excursions to relevant farms and institutions
Contact Hours	2 Lecture hours per week 3 Practical hours per week
NQF Credits	10
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module aims to develop students' understanding, skills and attitudes toward orphan crops' germplasm collection, storage and conservation.

Module Content

Conservation of Cultivated Plants: Origin, importance and domestication of cultivated plants, Origin of agriculture and ancient economic botany, Vavilov's Centers of Origin and diversity of crop plants, domestication, evaluation, bioprospection, Major plant introductions; Crop domestication and loss of genetic diversity. Exchange and biosafety issues: Plant Quarantine-Principles, objectives and relevance of plant quarantine; Introductory regulations and plant quarantine set up in Namibia; economic significance of seed-borne pests, pathogens and weeds; detection and post entry quarantine operations. Germplasm augmentation and conservation: History and importance of germplasm collection; Overview of Ecogeographical distribution of diversity. Static conservation: Features- No evolution; No new alleles. Conserved as a seed bank, tissue bank, pollen bank, DNA bank and cryo-bank. Dynamic-conservation Features: Evolutionary; generation of genetic variation; climate resilient. Germplasm repositories: Local level household gene bank (Seed and Field); Community; Religious sites, Ritual practices, community forest, seed network, landrace enhancement. National level conservation; International level-CGIAR, Global Seed Vault, World Seed Vault. Community seed banks are local institutions that provide access and benefit sharing. Mechanisms that realise farmers' rights and local level Access and benefits sharing. A general account of Biotechnology in plant germplasm acquisition, plant tissue culture in disease elimination, in vitro conservation and exchange, cryopreservation, and transgenics. Germplasm phenotyping; QTL mapping; global gene expression; candidate genes; Allele mining; entries into Marker (MAB) and Genomic Assisted Breeding (GAB). Field Excursion: Students will undertake field trips to local botanical gardens and plant genetic resources centres to get an insights of orphan crop conservation, management and utilisation.

Student Assessment Strategies

Continuous assessment 40% (minimum 2 Tests, 1 Assignment, 4 Practicals and one Field Trip Report); Examination 60% (1 x 3-hour paper).

F4811TD	PLANT BREEDING
Module Title:	Plant Breeding
Course Code	F4811TD
NQF Level	8
Notional Hours	200
Additional learning requirements	Excursions (visits to relevant farms for exposure), attachments and group projects on campus.
Contact Hours	4 Lecture hours per week 3 Tutorial hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module aims to equip students with skills in the application of plant genetics and the basic steps of a comprehensive plant breeding plan, namely objective setting, germplasm management, selection, quality assurance evaluation, and cultivar release.

Module Content

Introduction to Plant Breeding: Definition and significance of plant breeding in agriculture. Historical development of plant breeding and its contributions to food security. **Plant Reproduction and Genetics:** Understanding plant reproductive biology, pollination, fertilisation, and seed production. Principles of classical genetics and inheritance patterns in plants. **Plant Genetic Resources:** Conservation and utilisation of genetic diversity in crops. Introduction to germplasm banks, genebanks, and biodiversity conservation. **Breeding Objectives and Traits:** Defining breeding goals and selecting desirable traits for improvement, such as yield, disease resistance, quality, and tolerance to environmental stresses. **Breeding Methods:** Classical breeding methods, including selection, hybridisation, and backcrossing. Modern biotechnological techniques like molecular markers, genetic engineering, and gene editing. **Quantitative Genetics:** Understanding complex traits controlled by multiple genes. Estimation of heritability, genetic variance, and prediction of breeding values. **Population and Quantitative Genetics:**

Study of populations and their genetic structures. Applications of quantitative genetic principles in breeding programmes. **Breeding for Disease and Pest Resistance:** Strategies for developing plants with enhanced resistance to pathogens and pests. Incorporating genetic resistance into breeding programmes. **Breeding for Abiotic Stress Tolerance:** Developing crops with improved tolerance to drought, heat, salinity, and other environmental stresses. Use of molecular markers to identify stress-tolerant genotypes. **Molecular Breeding Techniques:** Marker-assisted selection (MAS) and genomic selection. Gene editing using techniques like CRISPR-Cas9 for precise trait modification.

Breeding for Quality and Nutritional Traits: Enhancing crop quality attributes, such as flavour, nutrient content, and shelf life. Biofortification strategies to improve nutritional value. **Hybrid Seed Production:** Principles of hybridisation and the production of hybrid seeds. Advantages of hybrid varieties and challenges in hybrid seed production. **Field Plot Techniques and Data Analysis:** Experimental design and layout of breeding trials. Statistical analysis of data and interpretation of results. **Ethical and Regulatory Considerations:** Ethical issues in plant breeding, including intellectual property rights and patenting. Compliance with regulations related to genetically modified organisms (GMOs). **Case Studies and Practical Applications:** Examining successful plant breeding programmes and their impact on agriculture. Hands-on experience in breeding techniques and data analysis.

Student Assessment Strategies

Continuous assessment is 40% (minimum 2 tests, 1 assignment, and 1 practical); Examination is 60% (1 x 3-hour paper).

F4812CF PLANT BIOTECHNOLOGY

Module Title:	Plant Biotechnology
Course Code	F4812CF
NQF Level	8
Notional Hours	200
Additional learning requirements	Compulsory field excursions (outside the normal practical)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

This module develops students' understanding and skills regarding plant biotechnology, both to produce improved crops using novel methods and to offer effective biosafety to policymakers and the public.

Module Content

Introduction: What is biotechnology? Definition of important terms, application of biotechnology in crop improvement, advantages and disadvantages. Plant tissue culture, Lab facilities and operations, Equipments and apparatus, Tissue Culture Media, Plant growth regulators, Establishing aseptic cultures, Plant Tissue Culture Techniques, Quantitative and Qualitative Improvement, Cell differentiation, Micropropagation by adventitious and Axillary Shoot Proliferation. Meristem Culture for Virus Elimination, Establishment of pathogen free plants, In-vitro meristem and shoot-tip culture, Virus indexing, Somatic Embryogenesis and Artificial Seed Production, In-vitro somatic embryogenesis, Organogenesis, Production of synthetic seeds, Applications and Limitations of somatic embryogenesis. Doubled Haploid Production, Androgenesis, Anther and Pollen culture, Gynogenesis, Diploidization of haploids, Applications of haploid production, Triploid Production by Endosperm Culture, Factors controlling callus proliferation and plant regeneration, Shoot regeneration, Histology, Cytology. Cell Suspension Cultures, History and evolution, Plant cell cultures vs. microbial cultures, Protoplast Isolation and Regeneration, Protoplast culture techniques, Somatic Hybridization and Cybridization, Protoplast fusion, Cybrids, Applications and Limitations of somatic hybridization, Somaclonal, Protoclonal and Gametoclonal Variation, Analysis of Somaclonal variants, Applications and Limitations of Somaclonal variations. Cloning Vectors, types and sequences of vectors, Gene Cloning and Methods of Gene Transfer, Bacterial Transformation methods and selection of recombinant clones, Transgenic technology, biosafety issues, role of transgenics in bioremediation. Cryopreservation, In-situ and Ex-situ methods, Steps involved in cryopreservation, advantages and disadvantages of in-vitro preservation. Molecular marker technology, types of markers, advantages and disadvantages, Application of molecular markers in crop improvement, genome editing and its tools. Field Excursion: Before classes end, students will undertake a one-week field trip to visit a biotechnology laboratory in Windhoek, or Swakopmund to appreciate their operations.

Student Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, at least 5 Practicals). Examination: 60% (1 x 03 hours paper).

F4882TG MOLECULAR GENETICS

Module Title:	Molecular Genetics
Course Code	F4882TG
NQF Level	8
Notional Hours	200
Additional learning requirements	Excursions (visits to relevant farms for exposure), field attachments and group projects on campus.
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
This course aims to provide students with a recapitulation of basic breeding principles, a basis to review articles on molecular plant breeding, and familiarisation with overall concepts in molecular plant breeding.

Module Content
Molecular Plant Breeding Concepts, Markers and Sequencing, Data Management and Quality Control, Modeling and Data Simulation, Cluster Analysis, Association QTL Mapping, Marker-Assisted Backcrossing, Marker-Assisted Selection and Genomic Selection, Genome Construction, Marker Management of Plant Genetic Resources, Biotechnological Tools for Broadening Genetic Variation, Modern Tools for Line Development and Predicting Hybrid Performance, Genomic Tools for Variety Registration and Protection, Introduction to Bioinformatics and Comparative Mapping and Genomics.

Student Assessment Strategies
Continuous assessment 40% (minimum 2 tests, 1assignment and 1 practical); Examination 60% (1 x 3 hour paper)

F4802TH BIO-SAFETY MEASURES IN CROP IMPROVEMENT

Module Title:	Bio-safety Measures in Crop Improvement
Course Code	F4802TH
NQF Level	8
Notional Hours	100
Additional learning requirements	None
Contact Hours	2 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	10
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
To ensure that the development and use of genetically modified (GM) crops are safe for the environment, human health, and biodiversity.

Module Content

Introduction to Biosafety: Definition of biosafety and its significance in crop improvement. Historical context and evolution of biosafety regulations. Risk Assessment and Management: Principles of risk assessment for GM crops. Identifying and evaluating potential risks to human health, environment, and biodiversity. Strategies for managing and minimising risks associated with GM crops. Environmental Impact Assessment: Evaluating the potential ecological impacts of GM crops on ecosystems, including gene flow and effects on non-target organisms. Techniques for predicting and monitoring environmental consequences. Regulatory Frameworks: Overview of national and international regulatory bodies and guidelines governing GM crops. Compliance with regulatory requirements for testing, approval, and commercialisation. Gene Flow and Containment: Understanding mechanisms of gene flow in plants and its implications for crop improvement. Containment strategies to prevent unintended spread of transgenes. Post-Release Monitoring: Designing and implementing monitoring programs to assess the long-term effects of GM crop cultivation. Methods for collecting and analysing data on environmental and health impacts. Ethical and Social Considerations: Exploring ethical issues related to GM crop development, including cultural and socio-economic impacts, engaging with stakeholders, and addressing public concerns.

Biotechnology Tools and Techniques: Understanding genetic modification techniques, such as gene editing and transgenic methods. Differentiating between traditional breeding and biotechnological approaches. Case Studies: Examining real-world examples of GM crop development, both successful and controversial. Analysing the outcomes and lessons learned from past experiences. Communication and Outreach: Effective communication of biosafety information to different audiences, including policymakers, farmers, and the public. Strategies for building public trust and fostering informed decision-making. Emerging Technologies: Exploring cutting-edge biotechnologies and their potential biosafety implications. Addressing challenges associated with novel crop improvement methods. Global Perspectives and International Cooperation: Understanding variations in biosafety regulations and approaches across different countries. Collaborative efforts and information sharing on biosafety at the international level.

Student Assessment Strategies

- Continuous assessment (at least two tests; 2 tutorial tests and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper).
- A student must obtain a minimum final mark of 50% to pass this module.

E.2.4.5 BACHELOR OF SCIENCE IN HORTICULTURE HONOURS

ADMISSION REQUIREMENTS

To qualify for entry into the Bachelor of Science in Horticulture Honours (NQF Level 8), the applicant must be in possession of either:

- A Bachelor of Science in Crop Production (NQF Level 7) from the University of Namibia.

Or

- An equivalent qualification from a recognized institution of higher education.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Core Semester						
F4810EP	Research Proposal	8	14	(2L/wk)	None	C
F3880AD	Design thinking	8	8	(2L/wk)	None	C
TOTAL Core Semester						**22**
Year 1: Semester 1						
F4833CH	Research Project in Horticulture	8	8	L (2h/wk)	F4830CD	C
F4821CB	Horticulture Pests and Diseases	8	10	L(2h/wk), P(3h/alt.wk)	None	C
F4811CC	Landscaping and Ornamental Horticulture	8	20	(4h/wk), P(3h/alt.wk)	None	C
F4831CD	Intensive Horticultural Production	8	20	L(4h/wk), P(3h/wk)	None	C
TOTAL Semester I						**58**
Year 1: Semester 2						
F4833CH	Research Project in Horticulture	8	8	(L(2hr/wk)	F4830CD	C
F4812CF	Plant Biotechnology	8	20	L(4hr/wk), P(3hr/wk)	None	C
F4832CG	Pomology	8	20	L(4h/wk), P(3h/alt.wk)	None	C
F4822CH	Post-harvest Physiology and Technology	8	10	L(2h/wk), P(3h/alt.wk)	None	C
Total Credits Semester 2						**58**
Total credits for YEAR 1						**138**

MODULE DESCRIPTORS

FIRST YEAR

Core Semester:

F3880AD	DESIGN THINKING
Module Title:	Design Thinking
Module Code	F3880AD
NQF Level	8
Notional Hours	80
Contact hours	(2 lecture periods per week for one semester)
Additional learning requirements	N/A
NQF Credits	8
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

The module aims to develop critical thinking and problem-solving skills. To develop interdisciplinary thought, problem structuring and design thinking skills, inculcating innovation, concept development, applied creativity, prototyping and experimentation.

Module Content

Problem structuring methods: creative reasoning, innovative offering (i.e. a new product) based on creative reasoning, various problem structuring methods from different disciplines; Design thinking dimensions: cognitive (reference to creativity & exploratory issues), social (reference to stakeholder & process issues), strategic (reference to creating value & organisational strategy).

Learning and Teaching Strategies/Activities

- Lectures: A blended learning mode will be used
- Group discussions & presentations: Students will be assigned some tasks in a group to enhance communication and team work skills. Some tasks will be assigned in groups for oral presentations in order to enhance critical thinking & presentation skills.
- Expand according to the programme.

Student Assessment Strategies

- The module will be evaluated using 100% continuous assessment (at least 2 assignments & 2 presentations). A minimum pass mark for the module is 50%.

F4810EP	RESEARCH PROPOSAL
Module Title:	Research Proposal
Module Code	F4810EP
NQF Level	8
Notional Hours	140
Contact hours	1 x 2hr lectures per week in semester core 1 x 2hr discussion forum per week in semester core
Additional learning requirements	N/A
NQF Credits	14
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Core Semester

Module Purpose

This module introduces research process and enable students to produce a research proposal ready for implementation. The module focuses on specific aspects of doing research including: identifying research gaps through stating the research problem, framing the research question and determining research approaches and designs; and ethical issues, reviewing literature that links to the research objectives and critical appraisal; reference management.

Module Content

Principles of Research design: Meaning of research, identifying different types of research, purposes of conducting research, the research process, Identifying topics for research; Qualities of a good research project, Literature review, Searching the literature, Managing the search yield; Interpreting and assessing the quality of the literature in the context of the topic, Presenting and synthesizing evidence; Research questions and objectives, Developing a research question; Research / Experimental design, Matching the purpose, aims, question and hypothesis with study design and methodology; Collecting and managing data; Data analysis; Budget, Ethical considerations and processes

Student Assessment Strategies

The assessment will include:

The module is based on 100% continuous assessment and the final mark will be calculated as follows:

- Module assessment quizzes (20%)
- Proposal report (50%)
- Proposal presentation (20%)

- Reflection on supervisor feedback (5%)
- Participation in forum discussions (5%)
- A minimum mark of 50% needs to be achieved in order to pass the module

Semester 1:

F4893CH	RESEARCH PROJECT IN HORTICULTURE
Module Title:	Research Project in Horticulture
Course Code	F4893CH
NQF Level	8
Notional Hours	160
Additional learning requirements	None
Contact Hours	2 Lecture hour per week
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This course allows the students to undertake independent academic research in Horticulture and produce a scientific report.

Module Content

Research Proposal: Written proposal (Horticulture) and oral presentation. Seminars: Departmental seminars (at least one) are determined by the Departmental students' research committee. Final Presentation: At least a 15-minute oral presentation of the research results. Final Project Report: Literature review relevant to the problem; methodology; results for each objective; discussion; conclusion and recommendations.

Student Assessment Strategies

The module assessment will be based on formative assessment only through 100% continuous assessment, which will constitute a weighting of:

- Research Proposal Presentation - 10%
- Research Proposal Report - 10%
- At least one seminar presentation 10 %
- Research Project presentation - 20%
- Research project report - 50%
- A student must obtain a minimum final mark of 50% to pass this module.

F4821CB	HORTICULTURE PESTS AND DISEASES
Module Title:	Horticulture Pests and Diseases
Course Code	F4821CB
NQF Level	8
Notional Hours	100
Additional learning requirements	Compulsory field excursions (outside the normal practicals)
Contact Hours	2 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	10
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module aims to equip students with comprehensive knowledge and practical skills necessary to effectively identify, monitor, and manage pests in horticultural crops while promoting the utilisation of beneficial insects for sustainable pest control and production as well.

Module Content

Management of important pests and diseases of food and horticultural crops by considering plant phenology, various vital pests and diseases, distribution and their economic importance, pest biology, causal agents of plant disease and their epidemiology, interaction between pests and their environment, and methods of control of pests and diseases of food and horticultural crops. Field Excursion: Before classes end, students will undertake a one-week field trip to Entomology Laboratory (Windhoek) and commercial farms in Okahandja, Otjiwarongo, Otavi, Grootfontein and Tsumeb, Namibia to appreciate various pest and disease control strategies used by farmers.

Student Assessment Strategies

- Continuous assessment (a minimum of 2 tests; 3 practicals, 1 assignment and 1 field report): 40%; and Examination: 60% (1 x 2-hour paper).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark.
- A student must obtain a minimum final mark of 50% to pass this module

F4811CC	LANDSCAPING AND ORNAMENTAL HORTICULTURE
Module Title:	Landscaping and Ornamental Horticulture
Course Code	F4811CC
NQF Level	8
Notional Hours	200
Additional learning requirements	Excursions (visits to relevant farms, recreational parks, and horticultural nurseries for exposure)
Contact Hours	2 Lecture hours per week 3 Practical hours per week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module aims to develop students' understanding, skills and attitudes regarding landscape design and management.

Module Content

Introduction to Landscaping: Importance, definition of terms, basic principles and elements of landscape design. Landscape Design: Reading drawings and design plans, types of drawings, site survey using essential surveying equipment, mapping, technical drawing, landscape drawing and design, design to address site deficiencies and garden setting. Ornamentals and Floriculture: Economic importance of cut flowers, ornamentals and turfgrass, classification and identification of ornamental plants for commercial and landscape use, functional and aesthetic value of plants in a landscape or indoors. Production and management of ornamentals: Site evaluation and ground preparation, climatic requirements, growth manipulation, nursery management, nutritional requirements, water needs and management of various landscaping systems, pest and disease control, harvest, and post-harvest handling. Propagation of ornamentals: Selection of plant materials, reproduction and maintenance requirements for trees, palms, cycads, shrubs, flowering plants, ground covers, turfgrass, climbers and indoor plants. Sustainable and Environmentally Sensitive Landscape Design: Design resource-efficient landscapes and gardens, installation of high-efficiency irrigation systems, selection of stress tolerant ornamentals, optimizing cut flowers production in the greenhouse, Turf/lawn management and preservation. Reuse materials/use recycled-content materials for landscape areas. Field Excursion: Before classes end, students will undertake a one week field trip to visit various farms, horticultural nurseries, and recreational parks in various towns such as Tsumeb, Otjiwarongo, Swakopmund as well as the Zoo Park and Parliamentary Garden in Windhoek to appreciate management practices applied.

Student Assessment Strategies

- Continuous assessment (a minimum of 2 tests; 6 practicals, 1 assignment and 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark
- A student must obtain a minimum final mark of 50% to pass this module.

F4831CD	INTENSIVE HORTICULTURAL PRODUCTION
Module Title:	Intensive Horticultural Production
Course Code	F4831CD
NQF Level	8
Notional Hours	200
Additional learning requirements	Excursions (visits to relevant farms for exposure)
Contact Hours	4 Lecture hours per week 3 Tutorial hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

This module aims to equip students with nursery, greenhouse, shade, and mist chamber crop production and management skills..

Module Content

Propagation structures: nursery, greenhouse, shade-house, and mist house; how they function; their management and maintenance. High-value crop/ plant production: tomatoes; sweet/ bell pepper; cucumbers; lettuce; spinach; Swiss chard; mushrooms; strawberries; ornamentals and cut flowers-planting; transplanting; management; crop protection; harvesting; shelf life and marketing. Nursery practices: preparation of nursery beds, soil management, planting procedures, control of seedling density, use of fertilisers, irrigation, and pest control. Greenhouse practices: temperature control, soil culture, hydroponic culture, carbon dioxide enhancement, integrated pest management. Shade-house: types of shade-house; advantage of shade-house; suitable crops; Mist house: types; uses/ advantages; suitable crops. Mushroom house and production: Mist system; temperature and humidity control systems; compost and substrate preparation; mushroom growing phase; automated production; watering control system; information management. Hydroponics: Hydroponics principles and infrastructure. Harvesting: moisture content, shelf life, harvesting indicators, harvesting methods and post-harvest handling. Marketing: Good harvest and post-harvest practices; marketing strategy; selling channels; price and quality. Field Excursion: Before classes end, students will undertake a one week field trip to visit various intensive horticultural production entities in

Tsumeb, Otjiwarongo, Grootfontein, Okahandja and Windhoek (Desert Green) to appreciate their management practices applied.

Learning and Teaching Strategies/Activities
Lectures, practicals, written assignments, fieldwork, group work, class discussions and presentations.

Student Assessment Strategies

- Continuous assessment (a minimum of 2 tests; 6 practicals, 1 assignment and 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark
- A student must obtain a minimum final mark of 50% to pass this module.

F4812CF PLANT BIOTECHNOLOGY

Module Title:	Plant Biotechnology
Course Code	F4812CF
NQF Level	8
Notional Hours	200
Additional learning requirements	Compulsory field excursions (outside the normal practical)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
This module develops students' understanding and skills regarding plant biotechnology, both to produce improved crops using novel methods and to offer effective biosafety to policymakers and the public.

Module Content
Introduction: What is biotechnology? Definition of important terms, application of biotechnology in crop improvement, advantages and disadvantages. Plant tissue culture, Lab facilities and operations, Equipments and apparatus, Tissue Culture Media, Plant growth regulators, Establishing aseptic cultures, Plant Tissue Culture Techniques, Quantitative and Qualitative Improvement, Cell differentiation, Micropropagation by adventitious and Axillary Shoot Proliferation. Meristem Culture for Virus Elimination, Establishment of pathogen free plants, In-vitro meristem and shoot-tip culture, Virus indexing, Somatic Embryogenesis and Artificial Seed Production, In-vitro somatic embryogenesis, Organogenesis, Production of synthetic seeds, Applications and Limitations of somatic embryogenesis. Doubled Haploid Production, Androgenesis, Anther and Pollen culture, Gynogenesis, Diploidization of haploids, Applications of haploid production, Triploid Production by Endosperm Culture, Factors controlling callus proliferation and plant regeneration, Shoot regeneration, Histology, Cytology. Cell Suspension Cultures, History and evolution, Plant cell cultures vs. microbial cultures, Protoplast Isolation and Regeneration, Protoplast culture techniques, Somatic Hybridization and Cybridization, Protoplast fusion, Cybrids, Applications and Limitations of somatic hybridization, Somaclonal, Protoclonal and Gametoclonal Variation, Analysis of Somaclonal variants, Applications and Limitations of Somaclonal variations. Cloning Vectors, types and sequences of vectors, Gene Cloning and Methods of Gene Transfer, Bacterial Transformation methods and selection of recombinant clones, Transgenic technology, biosafety issues, role of transgenics in bioremediation. Cryopreservation, In-situ and Ex-situ methods, Steps involved in cryopreservation, advantages and disadvantages of in-vitro preservation. Molecular marker technology, types of markers, advantages and disadvantages, Application of molecular markers in crop improvement, genome editing and its tools. Field Excursion: Before classes end, students will undertake a one-week field trip to visit a biotechnology laboratory in Windhoek, or Swakopmund to appreciate their operations.

Student Assessment Strategies
Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, at least 5 Practicals). Examination: 60% (1 x 03 hours paper).

F4832CG POMOLOGY

Module Title:	Pomology
Course Code	F4832CG
NQF Level	8
Notional Hours	200
Additional learning requirements	Excursions (visits to relevant farms for exposure)
Contact Hours	4 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	20
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
To equip students with skills in fruit production methods and orchard management practices.

Module content
Fruit categorisation: Temperate, tropical and subtropical fruit. Importance of fruit and nuts: Source of nutrients; foreign exchange; valuable by-products; as ornamental trees; used in agroforestry systems; environmental and socio-economic importance. Production constraints: Land scarcity; initial lag period of low farm returns; difficulties in gaining foreign market;

heavy post-harvest losses; unavailability of suitable planting materials; poor market facilities; poor management. Production solutions: Financial support; new cropping systems; introduction of new varieties; farmer training programme; rapid multiplication techniques; and improved fruit processing. Pruning: Pruning tools; pruning benefits; art and science of pruning; pruning tools; pruning effect on growth; pruning and training methods; fruit tree pruning techniques; fruit thinning; Common/ suitable peach propagation methods: Grafting/ budding and cuttings. Standard/ suitable grape propagation methods: Cuttings and budding. Expected/ suitable dates propagation methods: Offshoots and tissue culture techniques. Standard/ suitable mango propagation methods: Grafting/ budding; air layering. Common/ suitable almond propagation methods: Grafting, cuttings, tissue culture. Standard/ suitable macadamia nuts propagation methods: Grafting, cuttings, tissue culture. Standard/ suitable citrus propagation methods: Grafting/ budding; air layering. Apomixes, the advantage of apomixes over sexual reproduction. Growth regulators: Their use in fruit and nut plants. Good agricultural practices (GAP) include scouting, hygiene, record keeping, pollution management, pre-harvest interval, and field fruit holding sheds. Fruit and nut harvesting; properties of fruits and nuts regarding handling and shelf life; harvesting indicators; harvesting methods and post-harvest technology. Marketing: Good harvest and post-harvest practices; marketing strategy; selling channels; produce quality and marketing success. Field Excursion: Before classes end, students will undertake a one week field trip to visit orchards in Tsumeb, Otavi and Grootfontein to appreciate their management practices applied.

Learning and Teaching Strategies/Activities
Lectures, practicals, written assignments, fieldwork, group work, class discussions and presentations.

Student Assessment Strategies

- Continuous assessment (a minimum of 2 tests; 6 practicals, 1 assignment and 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark
- A student must obtain a minimum final mark of 50% to pass this module.

F4822CH POST-HARVEST PHYSIOLOGY AND TECHNOLOGY

Module Title:	Post-Harvest Physiology and Technology
Course Code	F4822CH
NQF Level	8
Notional Hours	100
Additional learning requirements	None
Contact Hours	2 Lecture hours per week 3 Practical hours per alternate week
NQF Credits	10
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
Provides knowledge on causes of post-harvest losses in horticultural crops and how different post-harvest management practices assist in increasing shelf life with the preparation of different products.

Module Content

Importance of post-harvest technology in horticultural crops: Maturity indices, harvesting, handling, and grading fruits, vegetables, cut flowers, medicinal and aromatic plants. Pre-harvest factors that affect quality, factors responsible for the deterioration of horticultural produce, physiological and biochemical changes, and hardening and delaying the ripening process. Post-harvest treatments of horticultural crops. Quality parameters and specifications: Structure of fruits, vegetables and cut flowers related to physiological changes after harvest. Methods of storage for local market and export: Pre-harvest treatment and pre-cooling, pre-storage treatments. Different storage systems, packaging methods and types of packages, and recent advances in packaging. Types of containers and cushioning materials include vacuum packaging, cold storage, poly shrink packaging, and grape guard packing treatments. Modes of transport. Determination of physiological loss in weight and quality: Grading of horticultural produce, post-harvest treatment of horticultural crops, physical and chemical methods. Methods of storage, post-harvest disorders in horticultural produce. Identification of storage pests and diseases in crops: Visit local markets, packaging houses and cold storage units.

Student Assessment Strategies

- Continuous assessment (a minimum of 2 tests; 3 practicals, 1 assignment): 40%; and Examination: 60% (1 x 2-hour paper).
- A subminimum of 40% in the examination is required to pass, irrespective of the final mark
- A student must obtain a minimum final mark of 50% to pass this module.

E.3 POSTGRADUATE DEGREE PROGRAM

POSTGRADUATE TRAINING PROGRAMMES AT UNAM

Students who are on full time employment should take studies on a part time basis.

Postgraduate Diploma Programmes

1. UNAM makes provision for Postgraduate Diploma programmes in selected fields as approved by Senate.
2. Postgraduate Diploma programmes offer specialised training, which is career-oriented.
3. Postgraduate Diploma programmes have a minimum of one year duration for full-time students, and two years for part-time students; are taught programmes (i.e. involve lectures, seminars, practicals, written tests and examinations, etc); and also include a small independent research component.

Master's Degree Programmes

1. Postgraduate training programmes at Master's degree level are of two types:
Master's degree by research culminating in a thesis.
Taught Master's degree involving at least one academic year of coursework followed by a mini thesis.

Students admitted to Master's degree programmes enrol on either a full time or part time basis. Master's degree programmes have minimum of two years duration for full-time students and three years for part-time students; and a maximum of three years for full time students and maximum of five years for part-time students, unless otherwise stipulated by programme specific regulations.

Doctoral Programmes

1. Doctoral programmes at UNAM are normally undertaken by research and the writing of a dissertation unless otherwise approved by Senate. The duration of a doctoral programme is a minimum of three for full-time studies and four years for part-time students; and a maximum of four years for full time students and maximum of six years for part-time students.
2. Doctoral study opportunities at UNAM are offered where the departments have the necessary qualifications for admission, where the relevant Department has the necessary research facilities and infrastructure, and where sufficiently qualified and experienced academics are available and ready to provide effective supervision.

Approval of Postgraduate Programmes

All programmes should be considered by the UNAM Postgraduate Studies Committee to ensure that they adhere to the UNAM Postgraduate regulations and standards of quality, before these programmes are recommended by the Academic Planning Committee (APC) to Senate for approval.

REGULATIONS AND GUIDELINES GOVERNING POSTGRADUATE APPLICATIONS

Eligibility for Admission/ Procedures to Apply for Postgraduate Studies

UNAM welcomes students with a range of qualifications from all over the world. Applicants must fulfil the minimum admission requirements for entry as well as English Language requirement (if relevant) as indicated. Competition for places in some programmes is extremely high, and the minimum requirement given may not be sufficient to be admitted. Due to this, applicants may be requested to undergo further screening processes.

Postgraduate Diploma

1. **Prospective students must be in possession of a relevant Bachelor's degree from UNAM or any other recognised institution.**
2. **Students who do not comply with (1) above may also be considered according to the University approved Recognition of Prior Learning (RPL) Policy.**

Master's Degree

1. **Prospective students must be in possession of a NQF (Namibian National Qualifications Framework) Level 8 Bachelor (honours) degree qualification or equivalent, with an overall grade average of 60% (and above) from UNAM or any other recognised institution, in the chosen field of study.**
2. **In addition, prospective students must satisfy Faculty specific requirements as indicated in the admission requirements of the relevant programme (e.g. minimum two years teaching experience and a screening test for M.Ed. admission).**

Doctor of Philosophy Degree and other Doctoral Programmes

1. Prospective candidates must be in possession of a NQF level 9 Master's degree or equivalent from UNAM or any other recognised institution, in the chosen field of study.
2. Students who enrolled for a Master's degree by thesis only may be considered for upgrading into the Doctoral Programme if, during the second year of registration they demonstrate sufficient original contribution(s) to

knowledge as motivated by the supervisors through the Faculty Postgraduate Studies Committee and approved by the UNAM PGSC.

APPLICATION PROCEDURES FOR POSTGRADUATE STUDIES

Application forms

Applications for postgraduate studies should be made on a University postgraduate application form which is available on request from the Office of the Registrar, Student Records Section, and can also be downloaded from the UNAM Webpage: **http://www.unam.edu.na**

Before completing the application form, applicants must familiarise themselves with all aspects pertaining to postgraduate studies as set out in this prospectus. Applicants must also acquaint themselves with the different modes of the programmes offered (e.g. taught programmes or by thesis/dissertation only, full time or part time). Applicants must ensure that all relevant documentation is submitted with the application form, together with a non-refundable application fee. Receipt of the application will be acknowledged by mail.

Prospective students with qualifications obtained from an institution outside Namibia (or non-accredited institutions in Namibia) must submit a Namibia Qualifications Authority (NQA) evaluation for such qualification together with their application forms compulsory. Please Note: this process takes at least 30 days and proof of submission to NQA will NOT be accepted.

All Master's by Thesis and Doctorate by Dissertation must submit a research topic concept note (maximum two pages) together with the application form. No consideration will be given to applications without the concept note.

Incomplete applications will not be considered.

The closing date for taught Master's and taught Doctoral applications is end of July **of each year or as advertised** (No late applications will be accepted).

Application for Master's and Doctoral programmes by thesis/dissertation only, will be accepted throughout the year.

Processing of applications

The completed application forms will be processed and forwarded by the Student Records Section to the Centre for Postgraduate Studies which will in turn forward the applications to the relevant Faculty/School/Department Admission Committees.

Admission of students

The Department/School recommends admission through the Faculty to the Centre for Postgraduate Studies taking into account the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space. A provisional admission letter indicating further conditions to be met as applicable will be issued to prospective student.

Master's by Thesis and Doctoral programmes by Dissertation

The relevant Faculty PGSC will recommend Supervisor(s) according to the applicant's area of study to the UNAM PGSC for approval.

Upon approval of the supervisor(s) by the UNAM Postgraduate Studies Committee and verification of other conditions, an admission letter is issued by the Centre.

It is the responsibility of the student to ensure that the supervision agreement (Annex 1) is signed with the supervisor. After verification of this agreement by the Faculty PGS Officer the student may register during the next registration period (first week of the month).

Master's and Doctoral Programmes by coursework

Upon recommendation by the relevant Department/School, the FPGSC will recommend a supervisor(s) according to the applicant's area of study to the UNAM PGSC for approval, at least six months before the start of the research component.

Study Permit Requirements

According to the Immigration Control Act of 19 August 1993, all International students (SADC and Non-SADC) must be in possession of a valid approved Study Permit and Visa before entering Namibia for the purpose of studying. All prospective (first and senior) students are required to apply for a Study Permit and Visa on the prescribed forms obtainable from the University of Namibia or at the Namibian Embassy in any country or the nearest Namibian Embassy or Ministry of Home Affairs and Immigration (Namibia) website.
Only persons with permanent Namibian Residence, Refugees or Asylum Seekers and Diplomatic representatives are exempted from applying for a Study Permit and Visa. The mentioned categories are exempted on condition that they provide the relevant documentation (i.e. Permanent Residence Permit, approved and endorsed Refugee/ Political Asylum Seekers status, a Courtesy Visa which confirms diplomatic status) to the University of Namibia.
Study Permits, Work Permits and Tourist Visas are not interchangeable. Kindly note that candidates in possession of a work permit will need to apply for a study permit if offered provisional admission to the University of Namibia.
The University of Namibia and the Ministry of Home Affairs and Immigration (Namibia) have a temporary arrangement that students may apply for their Study Permits during the duration of the scheduled registration period.

REGISTRATION FOR MASTER'S/DOCTORAL BY THESIS/DISSERTATION ONLY

Q.4.1.1 Registration of admitted students

1. All postgraduate students are expected to adhere to the deadline dates for registration as stipulated in the Faculty, Postgraduate and General Regulations Prospectuses.

2. All Postgraduate Students shall be required to register for the compulsory module on "Academic Writing for Postgraduate Students".

3. Students who apply for Masters/Doctoral may be required to enrol in selected modules, which will help to bridge any gaps in their earlier training or expose them to new developments in their study disciplines, as may be recommended by relevant FPGSC and approved by the UNAM PGSC. Students must pass these modules before they qualify for graduation.
4. All Postgraduate Students shall be required to register every year for the duration of the specific programme, unless approval has been granted for a break in studies.
5. Students who fail to register for any particular academic year will have to apply for re-admission to the programme and provide valid reasons why he/she could not register for the particular academic year.
6. A registered student may be allowed to transfer to the University of Namibia (from another institution) subject to written approval of the supervisor(s) and the relevant Postgraduate Studies governing bodies from both Universities involved. Registration is subject to the availability of suitable supervisors and all relevant processes and regulations of the University of Namibia.
1. A registered student may be allowed to transfer from the University of Namibia subject to written approval of the supervisor(s) and the relevant Postgraduate Studies governing bodies from both Universities involved.
2. No student shall be admitted as a candidate for more than one qualification at the same time without the special permission of Senate. Likewise, no student registered at the University of Namibia shall be permitted to enroll as a student at another university at the same time.
3. Senate may, after consultation with Faculties, restrict the number of candidates who may be permitted to register for a particular course of study, in which case Faculties may, from amongst the candidates qualified to register for such a course of study, select those who will be permitted to register.

REGISTRATION FOR MASTER'S/DOCTORAL PROGRAMMES BY COURSEWORK

Registration of admitted students

1. All postgraduate students are expected to adhere to the deadline dates for registration/addition of modules as stipulated in the Faculty, Postgraduate and General Regulations Prospectuses.

2. Students who are registered in programmes involving coursework and a thesis/dissertation will be required to enrol for core and elective (optional) modules, as prescribed in the relevant Faculty Prospectus and in the Centre for Postgraduate Studies Prospectus under the relevant Faculty.

3. Before registering for the research component, students must sign an agreement with the approved supervisor (Annexure 1) not later than six (6) months before the scheduled start of the research project, as reflected in the curriculum.

APPROVAL OF RESEARCH PROPOSAL

Within three (3) months of signing the agreement with the approved supervisor the research proposal accompanied by all supporting documents (e.g. informed consent form, interview guide etc) must be presented to the Faculty PGSC. The Faculty PGSC makes one of three recommendations:

Within six (6) months of registration for a Master's and within nine (9) months of registration for a Doctoral programme, the research proposal accompanied by all supporting documents(informed consent form, interview guide etc) must be presented to the Faculty PGSC. The Faculty PGSC makes one of three recommendations:

1. Approves the research proposal and recommends it, as well as the Ethical Clearance Certificate obtained from the CRP, to the UNAM PGSC for noting and issuing of the Research Permission Letter by the Director: Postgraduate Studies;
2. Rejects the research proposal and recommends de-registration of the student to the UNAM PGSC.
3. Grants an extension period of three (3) months for re-submission after which the Faculty PGSC makes one of the following recommendations:
3.1 Approves the research proposal and recommends it, as well as the Ethical Clearance Certificate obtained from the CRP, to the UNAM PGSC for noting and issuing of the Research Permission Letter by the Director: Postgraduate Studies;

3.2 Rejects the research proposal and recommends de-registration of the student to the UNAM PGSC;
3.3 Recommends registration at a lower level for a PhD candidate (Master's by Thesis only).

COLLABORATIVE POSTGRADUATE TRAINING

1. Through collaborative arrangements, students may undertake part of their training with other institutions of higher learning that the University is collaborating with.

2. Registration of students on collaborative programmes will be guided by the particular Memorandum of Understanding.

3. The implementation of collaborative programmes should adhere to terms and conditions stipulated in the Memorandum of Understanding.

CANCELLATION AND EXEMPTION OF MODULES

1. All postgraduate students are expected to acquaint themselves with the deadline dates for cancellation and exemption of modules as stipulated in the Faculty, Postgraduate and General Rules and Regulations Prospectuses.

2. No module cancellations or cancellation of studies will be effected without the completion of the required cancellation form signed by the student and Faculty Officer: Postgraduate Studies.

3. Students have to submit a complete exemption application form before the stipulated due dates to the Centre for Postgraduate Studies after recommendation by the relevant lecturer and Head of Department.

APPLICATION FOR BREAK IN STUDIES

1. Students who are unable to register for a specific year are expected to apply before 31 October for break in studies for the subsequent academic year, to the UNAM Postgraduate Studies Committee through the Faculty Postgraduate Studies Committee for a maximum period of one academic year. Reasonable justifications for the leave of absence should be provided.

2. When a student is on approved break in studies, the year of non-registration will not count as part of the duration of the study. However, students must re-apply before the closing date of applications for admission to activate their registration for the subsequent academic year.

3. A student who takes a break studies for a period of one (1) years will be required to:

4. Apply for re-admission to the University and Faculty/program.

5. Satisfy all requirements for admission, and

6. Start the programme from the first year.

APPLICATION FOR LEAVE OF ABSENSE

In order to be admitted to examinations, students are required to attend at least 80% of the lectures and to complete the required elements that make up the continuous assessment mark. Students who are unable to attend classes/tests for any reason, must complete the necessary application form (obtainable from the Office of the Registrar), and supply the necessary documentation. The application must be seen by all lecturers concerned, who will provide their comments and signatures. Final approval rests with the Registrar's Office. It will be the responsibility of the student to make up for missed events/complete the relevant requirements (including tests).

Q.8.1 ABSENCE DUE TO MATERNITY

Students who request absence from classes/tests for the purpose of delivery, must apply beforehand (application form obtainable from the Office of the Registrar), and provide a medical certificate, signed by a Medical Practitioner, indicating the expected date of delivery. Students will be expected to attend classes two weeks prior to and after the date of delivery. Should the date of delivery differ from the expected date students, on resumption of classes, will be expected to furnish a medical certificate stating the new date. A new, late application for absence from classes must be completed by the student in such cases.

Q.8. 2 ABSENCE DUE TO FUNERALS

Students who miss classes/tests due to funeral attendance must, prior to departure, apply for absence from classes (application form obtainable from the Office of the Registrar). On return, the student must supply satisfactory proof which confirms that the student attended the funeral. On receipt of the above mentioned, the application will be processed further. Students should note that absence from classes/tests should not exceed one week.

Q.8.3 ABSENCE DUE TO ILLNESS & OTHER REASONS

1. Students who miss classes/tests due to illness, must produce a valid medical certificate, signed by a Medical Practitioner, stating the period of absence and nature of the illness. An application for absence from classes must be completed by all students before or not later than five days after the illness, depending on the circumstances (application form obtainable from the Office of the Registrar). Students who are in possession of surgery dates, etc. will be expected to apply for absence from classes prior to their leave of absence. Permission will only be granted for emergency cases. The Registrar's Office reserves the right to reject such applications if the illness does not warrant absence from classes/tests.
2. Students should note that reasons such as over-sleeping, car trouble, transport problems, misreading the examination timetable, etc. will not be considered as valid reasons for missing tests / classes / examinations.

COURSEWORK EVALUATION AND GRADING

1. Students who are registered for postgraduate programmes by coursework will be examined according to procedures approved by Senate.

2. In all Schools, the meaning attached to letter grades awarded by examiners is as follows:

Grade	Interpretation	% Equivalence
A	Distinction	80 and above
B	Very Good	70 – 79

C	Good	60 - 69
D	Satisfactory	50 - 59
E	Fail	49 and below

3. Before a student can proceed to the thesis/dissertation research phase (in the case of coursework programmes), s/he must first pass all coursework modules. Subject to faculty regulations, a student with one module outstanding may register for the research project, provided that the outstanding module is not Research Methodology or module that deals with research or data analysis.

THESIS/DISSERTATION RESEARCH

Students who successfully complete the coursework phase, or who are registered for postgraduate studies by thesis/dissertation alone, undertake research in an approved research topic, and write a thesis/dissertation. This shall be after a specified period set by the relevant Committees and approved by Senate.

Thesis and Dissertation research may include an artistic/aesthetic component, presented in the form of a composition, a theatre/musical performance, and/or an exhibition of original works, as a partial fulfilment of the requirements for a Master's or Doctoral degree, respectively.

As a standard practice, every thesis/dissertation shall be accompanied by a declaration stating that it has not been submitted for a similar degree in any other university (Annex 2).

The thesis must contain a concise and comprehensive abstract of between 200-300 words and 300-400 words for the dissertation, indicating the main findings and major conclusions of the research. The abstract should be Times New Roman, font size 12, and 1.5 line spaced.

REGULATIONS ON THE TEACHING AT POSTGRADUATE LEVEL

1. To teach and supervise students at the master's and doctoral programme levels, a member of staff shall have a doctoral degree or equivalent in the discipline of the postgraduate programme being offered.
2. To teach and supervise students at the postgraduate diploma programme levels, a member of staff shall have a Master's or equivalent in the discipline of the postgraduate programme being offered.
3. Members of staff without PhD or equivalent qualifications but with specialised expertise can co-teach with members of staff holding doctoral degrees.

GUIDELINES ON THE RESEARCH SUPERVISION OF POSTGRADUATE STUDENTS

Q.12.1 ASSIGNMENT OF SUPERVISORS

1. Every postgraduate student shall be assigned a supervisor/supervisors (at least one (1) supervisor for Master's students and two (2) supervisors for Doctoral candidates) nominated by the relevant Department, recommended by the relevant Faculty Postgraduate Committee and approved by the UNAM Postgraduate Studies Committee on recommendation of the Faculty Postgraduate Studies Committee.
2. Where the student's research topic is multidisciplinary in nature, or where there is need for additional expert supervision in the same discipline, or where the student's postgraduate training programme involves sandwich arrangements, one or more additional supervisors may be appointed.
3. Postgraduate student supervisors will be appointed from suitably qualified members from UNAM Faculties/Centres; where there is a need to appoint an external supervisor there should be another supervisor from UNAM.
4. A supervisor for Master's and Doctoral students must have a doctoral degree and expertise in the field of study that he/she is expected to supervise. In addition, the supervisor must have relevant research and publication experience.
5. For purposes of mentorship, the co-supervision at all levels is strongly recommended. A supervisor without a doctoral degree will be considered to supervise Master's students (normally as a co-supervisor) subject to approval by the UNAM PGSC.

Q.12.2 GENERAL DUTIES AND RESPONSIBILITIES OF POSTGRADUATE SUPERVISORS

1. The supervisor must have a thorough understanding of the University's Postgraduate Regulations and Guidelines, in order to effectively guide the student towards attaining the stipulated standards.

2. The supervisor has the responsibility of ensuring that their students make progress in their studies. Where there are problems affecting the student's research progress, these shall be communicated to the UNAM Postgraduate Studies Committee through the Head of the relevant Department and the Faculty Postgraduate Studies Committee.

3. Supervisors should understand that:

(a) The Master's thesis research programme is designed as a training course, whereby it is intended that the student will:

* be exposed, acquire and apply fundamentals of research,

* acquire certain new techniques and methods of research,

* learn how to present the results of research in a scholarly manner, and

* make some contribution to knowledge.

(b) Master's students require close and careful supervision because they usually lack previous research experience, especially during the early stages of their theses (when learning about research methodology, experimental design and research technique) and also when preparing the initial drafts of their theses.

1. The supervisor of a Doctoral candidate should recognise that the candidates, in most cases, will have acquired some research experience when they were Master's degree students. What is expected of the Doctoral candidate is thus

qualitatively and quantitatively more than outlined above for Master's degree students. Here the supervisor expects the candidate to:

* make a distinct and original contribution to knowledge, of fact and/or theory;

* produce a considerable amount of original work;

* undertake a more critical and extensive review of the relevant literature than is the case for Master's students, and

* exercise considerable initiative in conducting the research.

1. After completion of a research proposal, the doctoral candidate should be able to work independently and be guided rather than be directed by his/her supervisor. It is, nevertheless, the supervisor's responsibility to guide the candidate in the right direction.

2. During the initial phase, the supervisors have the responsibility of assisting their candidates in the design and formulation of appropriate postgraduate research projects.

3. Supervisors should be able to determine, through their previous research experience, potential impediments to the research problem and advise the students on what can be achieved meaningfully, within the time allocated for the study.

4. The supervisors have the responsibility of monitoring the student's research progress throughout the research period:

(a) Both the supervisor and the student must submit compulsory report on the progress of the student to the relevant Departmental HoD before the end of each semester (Annex 3A and 3B). The Faculty PGSC will study the reports and take the necessary steps to resolve problems (where necessary).

(b) Where the departmental HoD is the supervisor, the deputy dean of faculty should sign.

(c) A summary report of all progress reports received and recommendations from the Faculty PGSC on problems identified and actions taken must be tabled during the July and November UNAM PGSC meetings.

(d) In order to ensure that the thesis/dissertation research proposals benefit from inputs from other academics in the Departments, every Faculty offering postgraduate programmes shall, in consultation with the supervisors, arrange at least one compulsory research seminars, which will enable the candidates to refine and improve the research proposal, report on progress and learn from others.

1. The supervisor has the ultimate responsibility of assisting the student to give an appropriate title to the thesis/dissertation, and to guide him/her on the presentation of the research results in the form of a scholarly thesis/ dissertation, in accordance with the set guidelines.

2. The supervisor and student should have regular meetings to discuss progress on the research project.

3. Although the writing of the postgraduate thesis/dissertation is the responsibility of the student, it is the supervisor's role to ensure that the standards set by the University are adhered to. The supervisor should:

(a) be accessible to the student during the critical stage of thesis/dissertation writing;

(b) discuss the drafts of the thesis/ dissertation with the student throughout the process;

(c) read the student's thesis/ dissertation carefully and critically, indicating where improvements are needed, e.g., where there is paucity of information, and where the important findings could be published, , etc.;

(d) at the conclusion of the work, read the entire thesis/ dissertation, and advise whether or not it is in a form suitable for presentation to examiners;

(e) but should not be responsible for personally editing language usage in the thesis, or correcting typographical errors. He/she should however, point out language and typographical errors.

1. If the student has two or more supervisors, one of these should be appointed as main supervisor and the rest as co-supervisor(s).

2. Should a supervisor be away from the University for more than three consecutive months, an acting supervisor must be appointed. In the case of absence of main supervisor, the co-supervisor will act. Where a student has only one supervisor an acting supervisor must be appointed by UNAM PGSC on recommendation of the FPGSC.

3. Where continued supervision is a condition of sabbatical or extended research leave, the Head of Department must ensure that these conditions are adhered to.

4. Where a supervisor retires or resigns from the University, he/she shall cease from supervising any student(s) under his charge, unless there is an agreement in writing for the continued supervision of the student(s).

5. If, in the course of the student's research, a situation develops whereby:

(a) there is a breakdown in communication between the student and the supervisor;

(b) there are personal clashes and conflicts between the two;

(c) the student refuses to follow the supervisor's advice;

(d) a change will enhance the progress of the student the case should be reported in writing to the Head of the relevant Department by either the supervisor or the student. The Head of Department has the responsibility to hear both sides of the case (that is, from the supervisor and the student) with a written report and recommendation to the FPGSC for possible action. The FPGSC will study the report and take action or make a recommendation (where applicable) to the UPGSC.

Staff members from research institutions will be allowed to supervise ten (10) students; the main supervision will be counted as 1 and co-supervision as 0.5 students, respectively. To ensure adequate supervision, a single staff member shall not supervise more than five (5) postgraduate students at any given time. Staff members' supervision responsibilities should be taken into consideration by Heads of Departments when other teaching duties are assigned.

Q.12.3 REMUNERATION OF SUPERVISORS

All supervisors will be remunerated upon approval of the graduation of the student by AEC, according to the tariffs determined by the University from time to time (Annex 17). Progress reports of the student during the duration of the study, signed by the supervisor(s), should accompany the claim form (Annex 18).

REGULATIONS AND GUIDELINES GOVERNING THE SUBMISSION OF THESES AND DISSERTATIONS FOR EXAMINATION

Q.13.1 NOTICE OF INTENT TO SUBMIT THE THESIS/DISSERTATION FOR EXAMINATION

1. At least three (3) months prior to the scheduled date for the submission of the thesis and four (4) months prior to the scheduled date for the submission of the dissertation, the respective postgraduate students shall, through their supervisors, Departments and Faculty PGSC, submit a written notice, to the UPGSC, declaring their intention to submit their theses/dissertations (Annex 4A). This is in order to allow sufficient time to organise the appointment of examiners before the submission of the thesis/dissertation.
2. Students who submit a notice of intent within a shorter period than specified in paragraph 1 above should note that the examination might be delayed.
3. Students who fail to submit their theses or dissertations within the time period indicated in the notice of intent should note that the examination of their thesis/dissertation may be delayed as new examiners may need to be appointed.
4. The abridged curriculum vitae of internal and external examiners nominated by relevant Faculty PGSC and Annex 4B shall be submitted together with the notice as per Annex 4A for approval by the UNAM Postgraduate Studies Committee (see Annex 5 for the format of the abridged curriculum vitae).
5. Student shall submit three ring bound copies of the Master's thesis and four ring bound copies of the doctoral dissertation (including soft copy in word version) through the relevant HoD postgraduate studies to the Centre for Postgraduate Studies for examination by the end of October of each year. The submission of the bound copies should be accompanied by a signed form (Annex 6).
6. Students submitting the thesis or dissertation after the due date may not graduate and must re-register and pay the required fees for the subsequent academic.
7. Students with no re-admission statuses must appeal for re-admission for the subsequent academic year, irrespective of the fact that the thesis or dissertation might have been submitted for examination.

Q.13.2 APPOINTMENT OF EXAMINERS

1. Every Master's thesis submitted shall be examined by at least two examiners approved by the UNAM Postgraduate Studies Committee on recommendation by the Faculty Postgraduate Studies Committee. At least one of the examiners in each case must be external to the University of Namibia, except when the student is a staff member in which case all examiners must be external. The supervisor(s) should not be one of the examiners.
2. Upon receipt of the notice of intent from the student, the Head of the Department should complete and submit Annex 4B together with the abridged CV's of the potential examiners to the FPGSC for recommendation and approval by the UNAM PGSC. Heads of Departments must declare any potential conflict of interest in the nomination and appointment of examiners. Examiners may NOT be selected from the pool of moderators already approved for modules in the specific taught programme.
3. In the case of doctoral dissertations, at least three examiners shall be appointed, of whom two must be external to the University, except when the student is a staff member in which case all examiners must be external. The supervisor(s) should not be one of the examiners.
4. Internal and External Examiners will be appointed on the basis of their expertise, independent from appointment of external moderators already approved for modules in the specific programme.
5. The examiner should not have any direct involvement in the research project of the student and must declare any past or present (personal or professional) connections with the student. Before final appointment the examiner should declare any direct conflict of interest by signing Annex 7.
6. An examiner for Master's students and Doctoral candidates must have a doctoral degree and expertise in the field of study that he/she is expected to examine. In addition, the examiner must have relevant research and publication experience.
7. The Director: Centre for Postgraduate Studies shall issue a letter of appointment to the thesis or dissertation examiners (Annex 8).

Examiners shall complete examination in the following periods: Mini thesis (Master's) = 6 weeks; Thesis (Master's) by research = 6 weeks; and Doctoral dissertation = 8 weeks.

REGULATIONS AND GUIDELINES GOVERNING THE EXAMINATION OF THE SUBMITTED MASTER'S THESES AND DOCTORAL DISSERTATIONS

Q.14.1 EXAMINATION OF MASTER'S THESES AND DOCTORAL DISSERTATIONS

1. Each examiner shall be required to examine the thesis or dissertation in detail and submit his/her comprehensive assessment under the following headings:

(a) Appropriateness of the thesis title. Comment on the appropriateness of the title as it relates to the content of the thesis or dissertation.

(b) Introduction: comment on the validity of the research problem, the extent to which the questions or objectives address the identified research problem and the justification for the study.

(c) Completeness of the Literature Review. Comment on the ability of the student to describe other researcher's contributions to similar problems. The literature review should lead the reader to a good understanding of what is already known about the research topic, what gaps of knowledge exist, what the study was intended to contribute, and what hypotheses guided the study. The examiners should comment on the candidate's familiarity with the literature.

(d) Research Methods: The examiners should also comment on the appropriateness of the research methods (and instruments, where relevant) employed in the study. Where applicable, comment on ethical considerations should be included.

(e) Presentation of the Results: The examiners should comment on the manner in which the findings of the study are presented. If tables of data are provided, are they reduced statistically? Are the statistical analyses appropriate? If illustrations are provided, are they of publishable quality? Is the description of the research results of adequate clarity and scholarship?

(f) Discussions and Conclusions: Are the conclusions clearly presented? Are they logical and supported by data? Has the candidate sufficiently indicated how his/her results compare with those of others, as cited in the literature? From the thesis/dissertation, is his/her contribution to new knowledge clearly brought out? In the case of Doctoral dissertations, is there evidence of sufficient originality? If there are weaknesses in the thesis/ dissertation, what are the shortcomings?

(g) Recommendations: Are the recommendations formulated address what was not reported in the thesis? Will the recommendations lead to addition of new knowledge to the current study?

(h) Language and Technicalities: Is the language used clear and concise? Are there major typographical errors? Is a language editor needed? (Where applicable).

(i) References: Are all the references cited in the text recorded on the reference list (and vice versa)? Are recent references used? Are the references used appropriate to the study? Is there consistence in the style of referencing used?

Summary: The examiner should present a summary indicating whether s/he recommends the thesis or dissertation for a postgraduate degree award. Exam should allocate marks for the thesis by following guidelines in Annex 9, and complete the Summary Form (Annex 10 & 11).

1. All examination reports must be submitted to the Director: Centre PGS within a stipulated time from the date of receipt of the documents. If the assessments are not received within two months, new examiners may be appointed.

2. The Director: Centre for Postgraduate Studies will forward the reports to the relevant HoD PGS, who will be responsible for distributing the reports to the supervisor.

3. Once the relevant HoD PGS has received all the reports for a particular student he/she removes the names and affiliation of the examiner as well as the allocated marks and distributes the amended report to the supervisor.

4. The supervisor will share the reports with the student to make the indicated corrections. Where the reports contain conflicting recommendations, the supervisor will guide the student in addressing them.

5. The revised thesis or dissertation together with a comprehensive table of corrections must be submitted to the supervisor to verify that all corrections have been made before the thesis or dissertation is bound.

1. Upon evaluation of the thesis, the examiner will recommend one of the following:
(a) PASSES subject to MINOR corrections ($\geq$ 50%)
(b) PASSES subject to MAJOR corrections ($\geq$ 50%)
(c) RE-SUBMIT FOR RE-EXAMINATION (no mark allocated)
(d) FAIL (< 50%)

A thesis re-submitted for re-examination shall be re-examined by the same examiner and awarded a maximum mark of 50%.

1. Upon evaluation of the dissertation, the examiner will recommend one of the following:
(a) PASSES subject to MINOR corrections
(b) PASSES subject to MAJOR corrections
(c) RE-SUBMIT FOR RE-EXAMINATION
(d) FAIL

No marks should be allocated for the dissertation. A dissertation re-submitted for re-examination shall be re-examined by the same examiner.

(a) Where a Master's thesis is recommended for re-submission, it must be re-submitted within 6 months, failure to do so the student will be deemed to have failed the thesis and will not be re- admitted.
(b) Where a Doctoral dissertation is recommended for re-submission, it must be re-submitted within 12 months, failure to do so the student will be deemed to have failed the dissertation and will not be re- admitted.

(c) Where a thesis or dissertation is submitted for re-examination, the examiner should indicate whether the student has satisfactory addressed the identified shortcomings in the first submission.

1. In cases where the examiners of the thesis disagree in their recommendations (fail versus pass), Faculty PGSC should recommend an independent external examiner to the UNAM PGSC for approval to serve as arbiter on the thesis.

2. Where two examiners fail a dissertation the student will be deemed to have failed the dissertation and will not be re-admitted.

3. Where one examiner fails a dissertation, School PGSC should recommend an independent external examiner to the UNAM PGSC for approval to serve as arbiter on the thesis or dissertation.

1. For both theses and dissertations the assessment of the arbiter will be FINAL.

2. A copy of the first version of the thesis or dissertation submitted for examination will be sent to the arbiter.

3. In cases where the difference in the pass marks allocated for a thesis, by the internal and external examiner, is 20% or more, the Departmental Head must set up a departmental committee (excluding the supervisor and internal examiner) to study the case and recommend a mark for the thesis and provide a motivation on the decision to the UNAM PGSC, through the Faculty PGSC. Where the departmental Head is the supervisor or the examiner, the Dean shall appoint an independent person to study the case and recommend a mark for the thesis and provide a motivation for his/her decision to the UNAM Postgraduate Studies Committee.

4. All examination reports, including any reports that recommended a fail must be submitted by the faculty PGS HoD to the UNAM Postgraduate Studies Committee for recommendation to AEC.

5. A postgraduate student, who disagrees with the results of the examination as approved by AEC, may appeal to the HoD PGS within two weeks after the release of the results giving reasons and evidence to support the appeal.

Q.14.2 PUBLICATION FROM A THESIS OR DISSERTATION

Students are encouraged to publish work from their thesis/dissertation in accredited journals. The following acknowledgements must be included in such publications:

"This work forms part of a Master/PhD study undertaken at the University of Namibia".

Any publication from thesis/dissertation must show UNAM as the student's affiliation.

A list of publications and conference presentations by the student, that was part of their study, should be listed in the thesis immediately after the abstract.

Q.14.3 VIVA VOCE EXAMINATION FOR STUDENTS REGISTERED BY THESIS OR DISSERTATION

1. In addition to writing a thesis or dissertation, the postgraduate students who are registered for Master's by Thesis and all Doctoral students, shall appear for a *viva voce* examination, to defend the submitted work before a panel of specialists on the subject.

2. The Centre for Postgraduate Studies is responsible for administering the *viva voce* examinations for doctoral students while the respective Faculties/departments are responsible for administering the *viva voce* examinations for master's students.

3. The *viva voce* examination shall take place only after the UNAM PGSC is satisfied that the thesis or dissertation submitted by the student is considered by the examiners to be of an acceptable standard.

4. The questions to be asked in the *viva voce* examination shall primarily be focused on the student's thesis or dissertation research area. The public can attend and WILL BE PERMITTED to ask questions.

5. The *viva voce* panel shall consist of the examiners and supervisors of the thesis or dissertation.

6. The Chairperson of the *viva voce* panel shall be a senior academic (at least at the rank of Associate Professor for Doctoral students and Senior lecturer for Master's students) and shall not be one of the supervisors or examiners. The *viva voce* panel (including the chairperson) shall be approved by the Director of the CPGS on recommendation of the relevant HoD PGS.

7. The main supervisor must provide the relevant HoD PGS with an electronic copy of the corrected thesis or dissertation, who will distribute it, together with copies of the examiners' reports to the panel members at least two weeks before the date of the *viva voce* examination.

8. All members of the *viva voce* panel must acquaint themselves with the postgraduate processes and procedures.

1. The functions of the *viva voce* panel shall be:

(a) to ascertain that:

* the thesis/dissertation presented (the data, methodology, analysis and findings) is the original work of the student

* the shortcomings identified during the examination process have been addressed.

* the broader subject area in which the study is based is fully grasped by the student.

* any weaknesses in the thesis/dissertation can be adequately clarified by the student,

(b) to make a definite recommendation to AEC through the UNAM PGSC, as to whether the student be deemed to have passed or failed the study (Annex 12).

1. The *viva voce* panel shall, as far as possible, endeavour to reach a unanimous decision on the student's performance. Where the panellists are unable to reach a consensus as to whether the student passes or fails, a vote may be taken to arrive at a reasonable decision. A majority vote shall be required for passing the *viva voce* examination.

1) (a) At the end of the viva voce, the panel shall sign a *viva voce* Examination Results Form (Annex 12) making a specific recommendation to AEC through the UNAM PGSC on the student's performance.
(b) The Chairperson of the panel shall also submit to the UNAM PGSC a comprehensive report (Annex 13) signed off by the *viva voce* panellists. This should be done within one week of the examination. The report should include, an attendance register, challenges faced with the *viva voce* examination, a summary of the presentation, the discussion during the *viva voce* examination, any strong/weak points identified during the presentation and discussions, including any specific recommendations to the student.

2. The duration of the *viva voce* shall be two hours for masters and three hours for PhD.

3. The Chairperson of the *viva voce* Panel should announce the recommended outcome of the examination to the audience; but the qualification can only be awarded after approval by AAGC.

Q.14.4 SUBMISSION OF FINAL BOUND THESES OR DISSERTATIONS

After all the corrections as recommended by the examiners (including those from the viva where applicable) have been made to the satisfaction of the supervisor(s), five fully bound copies of the theses or dissertations shall be submitted to the Faculty PGSC for inspection before submission to the Centre for Postgraduate Studies. Where a student has been supervised by more than one supervisor, an additional copy for each additional supervisor must be provided. In addition, an electronic version of the thesis or dissertation compiled as a single document in PDF format shall be submitted. Please note that the final thesis or dissertation must be in the format as prescribed in B19.

Q.14.5 PRESENTING STUDENTS FOR GRADUATION

The Faculty Officer: School will only submit the names of students for graduation approval by AAGC on recommendation of the UNAM PGSC when the following conditions have been met:

1. Updated academic record reflecting the eligibility of the student for graduation.
2. Completed checklist confirming, amongst others, that corrections have been effected after receipt of examiners reports and *viva voce* examinations, (including a table of corrections), where applicable.
3. All signed examination reports (including, where applicable, arbiter/failed examination report).
4. Five (5) bound copies and one (1) electronic copy (in PDF format) of the Thesis or Dissertation has been submitted as per Regulation B.16.4.

Q.14.6 REMUNERATION OF EXAMINERS

All examiners will be remunerated upon receipt of the examination report compiled using the examination guidelines in B.16.1, according to the tariffs determined by the University from time to time.

Q.14.7 AWARDING OF A QUALIFICATION AT A LOWER LEVEL

1. A student who is de-registered for a taught Masters programme due to failure to successfully complete the research component, may be awarded a relevant and existing Postgraduate Diploma in the field provided that all the taught modules are passed and the research component is re-written and passed as a research project/paper. Award of this PGD is subject to approval by AEC on recommendation of the UNAM PGSC.

2. A student who was awarded a Postgraduate Diploma according to paragraph (1) above, will not be allowed to register for the same taught master programme at a later stage.

3. A student who fails a Masters by research, may be allowed to re-apply for re-registration on a completely different topic or a taught Masters programme.

4. A student who fails a PhD, may be allowed to re-write the dissertation in the format of a thesis incorporating all the recommended amendments and corrections of the examiners within a period of 12 months after the release of the results. The re-submitted thesis will be examined according to the regulations of Masters degrees.

5. A Student who was awarded a Master's degree according to paragraph (4) above, and wish to apply for a Doctoral programme at a later stage, will have to choose a different topic.

POSTGRADUATE FEES

All registered students shall pay the various categories of fees as approved by the University Council on recommendation of appropriate Committees of UNAM (Refer to Student Fees booklet and PG Studies Fees brochure).

GUIDELINES ON THE WRITING OF POSTGRADUATE WORK

Q.16.1 GUIDELINES ON THE WRITING OF RESEARCH PROPOSALS

Outline of the proposal

All research proposals must be prepared according to the following layout:

Title of the proposed study (refer to Annex 14 for the format of the title page)

The title of the mini thesis/thesis/dissertation research proposals should be clear and concise. From the title, one should be able to infer clearly the subject of the mini thesis/thesis/dissertation. This means that the title should be self-explanatory and limited to the scope of the study.

1. INTRODUCTION

1.1 Background of the study
Give a general overview and background of the research problem.

1.2 Statement of the problem
Students should concisely formulate their research problems by clearly indicating research issues they would like to investigate in their studies. This should include the purposes of their studies

1.3 Either objectives of the study or research questions (NOT BOTH)
Based on the statement of the problem, students should state either objectives or research questions of their studies. They should do this unambiguously.

1.4 Hypotheses of the study (where applicable)
Where applicable, particularly in the Natural Sciences, students should state unequivocal and testable hypotheses that are based on theory and on the statement of the problem. Each hypothesis should have a clear rationale.

1.5 Significance of the study
Students should state the importance of their studies, the anticipated contribution of such studies to knowledge and to socio-economic progress.

1.6 Limitation of the study
Students should indicate the logistical, resource and other limitations of their studies and indicate the possible impact of such limitations.

1.7 Delimitation of the study
Students should indicate the specific scope of the study, providing the rationale for such delimitation.

2. Literature Review and where applicable, the theoretical framework

Students should prepare critical, synthesised and integrated literature reviews that should demonstrate the need and justification of their studies. The reviews should show gaps in knowledge, theoretical and methodological shortcomings, need for further research, unanswered questions, and disagreements in literature and theoretical frameworks that may need to be revised to resolve controversies. In addition, the reviews should demonstrate what has been done in research areas of interest and what remains to be investigated.

3. Research Methods

3.1 Research Design
Students should provide clear statements on either quantitative or qualitative research designs they intend to use. It is not necessary to provide the definitions of the research designs. However, they should specify how they intend to use particular research designs in their studies. They should not merely provide the distinction between the two generic designs.

3.2 Population (where applicable)

Students should, where applicable, specify the population to which they would like to confine their research/studies.

3.3 Sample (where applicable)
Students should clearly explain how they intend to draw samples from the target populations. They should specify how they intend to appropriately use either quantitative or qualitative sampling techniques to draw research samples. Merely describing what these sampling techniques are is inadequate.

3.4 Research Instruments (where applicable)
Research instruments and measures that would be used to collect data should be clearly provided under this section.

3.5 Procedure
The manner in which data would be collected should be explained here. How research instruments would be used to collect data should be specified in this section.

3.6 Data analysis (where applicable)
In this section, students should provide specific descriptive and/or statistical tests that they would employ to analyse their data, and rationale. Mere reference to particular quantitative data analysis statistical packages and electronic qualitative data analysis procedures would not be sufficient.

3.7 Budget (where applicable)

3.8 Research Ethics
Students should provide detailed information about ethical issues and *how* they will address potential ethical dilemmas when conducting their research.

3.9.1.1 References
Students should use the referencing format approved by respective faculties/departments. Where there is no prescribed referencing format by faculty/department, the *American Psychological Association* (APA) **becomes the default. There must be consistency between sources cited in the text of the proposal and sources of information indicated in reference lists. Unless critical in the area of research, primary and secondary sources of information cited shall not be more than 10 years old. Students should use refereed/verifiable sources of information.**

Research proposals submitted for consideration by the Faculty Postgraduate Studies Committee shall capture the above information in a clear and concise manner and not exceed the maximum page number stated below:

a) Master's by coursework (mini thesis) shall not exceed 6 pages
b) Master's by research shall not exceed 8 pages.
c) Doctoral Degree shall not exceed 10 pages.

In all cases the research proposal should be Times New Roman, font size 12, double spaced and on one side of the paper.

The School PGSC recommends the research proposal to UNAM PGSC for noting after evaluating the proposal using Annex 15, and issuing of the Research Permission Letter (Annex 16) by the Director: Postgraduate Studies;

De-registration of postgraduate students who fail to make progress

Schools shall deregister postgraduate students who fail to make progress as stipulated under B.6.2.

REGULATIONS AND GUIDELINES FOR WRITING AND PRESENTATION OF POSTGRADUATE THESIS AND DISSERTATIONS

Broad Guidelines on Mini Thesis/Thesis/Dissertation Manuscript Preparation

Typing/Word-processing

The document must be typed and printed on good quality white A4 paper. The typescript must be clear, Times New Roman, font size 12, double spaced and on one side of the paper.

Pagination

The preliminaries (i.e., parts preceding the Introduction) must be in lower case Roman numerals (i.e.: (i), (ii), (iii), (iv)...), beginning with the title page which should not be numbered. The pages in the main body of the document should be numbered in Arabic numerals (i.e.: "1", "2", "3", "4"...) consecutively throughout. The page numbers should be centred in the lower margin.

Margins

The left margin must be 4.0 cm; the right hand margin must be 2.5 cm; the top margin must be 2.5 cm, and the bottom margin must be 2.5 cm.

Title page

The title page must be organised according to (Annex 14)

Components of the preliminary pages (Each starting on a separate page)

Abstract

Following the title page, the mini thesis/thesis/dissertation shall contain an abstract which concisely and comprehensively summarises the essential points and conclusions emanating from the research. The abstract should be between 200-300 words (not exceeding 1 page) in the case of Master's theses, and 300-400 words (not exceeding 2 pages) for Doctoral dissertations. Furthermore, it should include the purpose of the study, a brief overview of the methodology used, the main findings, major conclusions and recommendations. The abstract should not contain headings with 1.5 line spaced.

List of Publication(s)/Conference(s) proceedings

A list of publications and conference presentations by the student, that was part of their study, should be listed in this section. Any publication from thesis/dissertation must show UNAM as the student's affiliation.

Table of Contents

The Table of Contents shall be generated to include level three subheadings.

List of Tables

If there is a list of Tables, these should be consecutively numbered in Arabic numerals following the guidelines of the relevant department/faculty approved referencing style.

List of Figures

If there is a list of Figures, these should be consecutively numbered in Arabic numerals following the guidelines of the relevant department/faculty approved referencing style.

List of Abbreviations and/or Acronyms

Acronyms and non-standard abbreviations should be listed alphabetically in bold; the definitions should not be bolded.

Acknowledgements

The document shall also contain an Acknowledgements section, in which the candidates express their appreciation and gratitude to all the people and institutions which rendered help in the course of the study.

Dedication

If the candidate wishes to dedicate the document to any person, the dedication should be concisely written, and should appear in the preliminaries.

Declarations

The document shall contain the various declarations as outlined in (Annex 2)

Body of the Thesis/Dissertation

a) Master Theses **should broadly follow the outline in the proposal (B18.1). In addition it should include results, discussions, conclusions and recommendations as detailed below.**

Tables, text figures, diagrams and photographic illustrations should be numbered in separate sequence, and be referred to by number in the text. Each table and figure should have a concise but comprehensive caption. The illustrations should be of publishable quality (600 dpi or higher).

Results:

Data should be presented in a clear and concise and informative manner.

A variety of forms might be used to present data, however the same data must not **be presented in more than one form(for example tables and figures)**

Where applicable primary data should be attached as an appendix and not appear in this section

Discussions:

It should not merely be a description of the findings (tables and figures)in words

This section forms the core of the document and therefore need to be a critical analysis of the results and demonstrate insight and understanding of the findings.

Results and findings must be discussed in context and linked to literature and the stated research aims.

The discussion must address the objectives and/or questions of the study

Conclusions:

This should not be a repeat of the results and /or discussion

It should relate directly to the main objective(s) of the study.

It must indicate whether the problem was solved, what was learned through the research, what remains to be learned, weaknesses and shortcomings of study, strengths of study as well as possible applications of study (how it can be used).

Recommendations

Must emanate from the research findings and must be feasible

Gives opinion on what measures should be adopted to solve the problem based on the conclusions made.

May endorse the research findings as the solution to the problem or may propose an alternative route.

Identify information gaps or inconsistences and suggest further studies to address these.

References

Should follow the department/faculty specific referencing style

Appendices

Should be numbered sequentially and can include the following:

Ethical clearance certificate
Research permission letter
Other relevant permissions (where applicable), e.g., collection permits, informed consent documents, etc.
Data collection Instruments such as questionnaires, interview protocols, pre and post-tests etc.
Any other relevant data such as supplementary information, raw data etc.

b) Doctoral Dissertations **should follow a** stand-alone chapter **(journal publication) approach.**

Tables, text figures, diagrams and photographic illustrations should be numbered in separate sequence, and be referred to by number in the text. Each table and figure should have a concise but comprehensive caption. The illustrations should be of publishable quality (600 dpi or higher).

Introduction Chapter (Chapter 1)

This chapter must introduce the study and provide a comprehensive overview of the research problem, and broadly follow the guidelines as indicated above.

Literature Review (Chapter 2)

1. **This chapter must provide a comprehensive literature review and broadly follow the guidelines as indicated in (B.19).**
2. **This should demonstrate critical understanding and comprehension of the current state of knowledge in the area of research and lead to the motivation for the study.**
3. **The literature should focus on recent developments in the area of study.**

Stand-alone chapters

Each Faculty and/or department has a choice to decide whether to use a stand-alone chapter or use the guidelines for Master thesis.

Guidelines for stand-alone chapters are as follows:

Each of these chapters introduces and represents an independent research aim/objective/question **and should follow the outline below:**

Title, Abstract, Keywords, Introduction, Materials and Methods, Results and Discussion, Conclusion, and References (Should follow the approved department /school/ faculty specific referencing style).

Concluding chapter

This chapter integrates all findings of the study and conclusions with feasible recommendations/reflections. Original contribution(s) to knowledge must be clearly pointed out.

Appendices

Should be numbered sequentially and can include the following:

1. **Ethical clearance certificate**
2. **Research permission letter**
3. **Other relevant permissions (where applicable), e.g., collection permits, informed consent documents, etc.**
4. **Data collection Instruments such as questionnaires, interview protocols, pre and post-tests etc.**
5. **Any other relevant data such as supplementary information, raw data etc.**

Language

The presentation of the thesis or dissertation shall be in English. The use of a language other than English requires approval of the UNAM PGSC. In such cases, the abstract must be in both English and the approved language.

Length of Theses/Dissertations

The suggested guidelines are as follows (A4 double spacing):

(a) Master's theses for coursework programmes(Mini Theses)**: The recommended length of Mini theses for coursework programmes is as follows:**

1. **Mini Theses with less than 100 credits: a minimum of 15,000 words and a maximum of 22,000 words (not exceeding 90 pages).**
2. **Mini Theses between 100–140 credits: a minimum of 18,000 words and a maximum of 30,000 words (**not exceeding 120 pages**).**
3. **Mini Theses above 140 credits: a minimum of 30,000 words and a maximum of 37,000 words (not exceeding 150 pages).**

(b) Master's theses (by research)**:**

The recommended length of a Master's thesis is a minimum of 30,000 words and a maximum of 45,000 words (not exceeding 180 pages**).**

(c) Doctoral dissertations**:**
The recommended length of a Doctoral dissertation is a minimum of 46,000 words and a maximum of 75,000 words (not exceeding 300 pages**).**
Binding of Theses/Dissertations

(a) Candidates should ensure that when binding the theses/dissertations, the spine shall contain the name of the candidate, the degree for which it was submitted, and the year of degree award (graduation year).

(b) The colour of the cover for Master's theses shall be red **and that for Doctoral Dissertations shall be** black**.**

Note: The thesis/dissertation MUST be subjected to plagiarism software i.e.

E.3.1.1 MASTERS IN AGRICULTURAL ECONOMICS (31MSAE)

ADMISSION REQUIREMENTS

To be eligible for this MSc:

- The candidate must have completed the UNAM Bachelor of Science Honours degree at NQF level 8 or equivalent in a relevant discipline from any recognised higher education institution, with an average of at least 60%.
- Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
- Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility and availability of a supervisor. As per Section B.3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Year 1 Core Semester						
U6989LA	Academic Literacy for Post-Graduate Students	9	Non-contributing	4L	NONE	C
Year 1 Semester 1						
F6931AE	Applied Econometrics	9	24	4L/2P	NONE	C
F6931PE	Applied Production Economics	9	24	4L/2P	NONE	C
F6921EE	Environmental Economics	9	12	2L/1P	NONE	C
Total Credits Semester 1						**60**
Year 1 Semester 2						
F6932ME	Applied marketing and price analysis	9	24	4L/2P	NONE	C
F6922FE	Measuring and monitoring food security	9	12	2L/1P	NONE	C
F6932IE	Institutional Economics	9	24	4L/2P	NONE	C
Total Credits Semester 2						**60**
Total credits year 1						**120**
Year 2: Semester 1 & 2						

F6983TE	Thesis	9	120		NONE	C
Total credits YEAR 2: semester 1 & 2						**120**
Total credits						**240**

MODULE DESCRIPTORS

FIRST YEAR

U6989LA ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS

Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2. Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.

Module Purpose
The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content
The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.
Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.
Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.
Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

Learning and teaching enhancement strategies
1. Internal moderation of module content and assessment tools.
2. Peer review of module outlines and teaching practices, emphasising constructive alignment.
3. Ongoing evaluation by students.

4. Regular review and updating of module content.
5. Vigilant and efficient supervision and monitoring of examination papers, assignments, and tests.
6. Evaluation of lecturers through peer assessment.

F6931AE	APPLIED ECONOMETRICS
Module Title:	Applied Econometrics
Module Code	F6931AE
NQF Level	9
Notional Hours	240
Contact hours	4 L + 2 P/wk
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
The purpose of this module is to enhance the concepts and frameworks used in Econometrics analysis and to provide students with clear understanding of empirical research tools.

Module Content
Econometric models. The value of data for analysis, testing of data for linear regression: assumptions of the linear regression model, Ordinary Least Squares (OLS) estimators and properties, hypothesis testing: single and multiple restrictions, forecasting, least square dummy variables (LSDV). Violations of the linear model assumptions: Multi-collinearity, heteroscedasticity, serial correlation and distributed lag models, Generalised Least Square estimators (GLS). Advanced topics: Dynamic modelling, Quantitative response and probability models such logit, Tobit and probit analysis, nested logit models, co-integration, instrumental variables and 2-stage least squares. Panel data econometrics: random effects model and fixed effects. Cross-sectional and Survey / longitudinal data analysis. Practical examples and liaison with industry

Student Assessment Strategies
Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x3 hr paper)

F6931PE	APPLIED PRODUCTION ECONOMICS
Module Title:	Applied Production Economics
Module Code	F6931PE
NQF Level	9
Notional Hours	240
Contact hours	4 L + 2 P/wk
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
The purpose of this module is to enhance the applied concepts in production economics and how it relates to agricultural production.

Module Content
This module follows the graduate modules and is taught at the intermediate level and now moves beyond the single input production function to analysis with multi-variable functions. Detailed exposure to production, cost and profit functions, and the duality that exists between these is a core element of the module. The focus will also be on the implications of the properties for the economic behaviour of agents. At the end of this module students will have complete competence in algebraically solving for the cost minimisation and profit maximisation problems. Themes covered in the module are: Properties of production functions. Economic theory of cost. Economic Theory of Profits. Duality between the cost and production functions. Duality between the profit and production functions. Relationship between profit and cost functions and technology sets; Cost functions; the short and long runs; and Issues of specification and estimation of production, cost, and profit functions. Economic applications: optimal input decision/ price discrimination. Constrained optimization with equality constraint: first and second order conditions. Application: least-cost combination of inputs; various production functions; their characteristics and their elasticities of substitution. Uncertainty and Risk: The distinction between risk and uncertainty; Expected utility theory; Risk aversion and measurement; Risk analysis and risk management (including aspects of insurance and other coping strategies).

Student Assessment Strategies
Student Assessment Strategies
Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x3 hr paper)

F6931EE	ENVIRONMENTAL ECONOMICS
Module Title:	Environmental Economics
Module Code	F6931EE
NQF Level	9
Notional Hours	120
Contact hours	2 L + 1 P/wk
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

Production Economics focuses on how innovation in production technologies and production systems change the structure of production and labour around the world, and the changing management of production in this ever-changing structure.

Module Content

Basic issues in environmental economics: scope and nature of environmental economics, evolution of environmental economics; paradigms and basic concepts related to the interaction between environmental processes and economic management; economic development and the environment, factors responsible for environmental degradation; market, policy institutional failures; environmental Kuznets' hypothesis; ethics, efficiency, discounting, optimality and sustainability; sustainability and economic development (weak and strong sustainability hypotheses, growth, equity and ecological preservation.) Natural resource extraction and management. taxonomy of natural resources and challenges in their management, inter-temporal dimension of natural resources, dynamic optimization: basic mathematical tools for dynamic optimisation; continuous and discrete time problems; finite and infinite horizons problems. Application of the Faustmann model and Hotelling rule. Non-renewable resources: optimal extraction of non-renewable resources with and without extraction costs; optimal extraction programmes under competitive and monopolistic market conditions; effects of uncertainty (exploration and discovery, recycling), African examples. Renewable resources: natural growth, regeneration and cyclical resources; maximum sustainable yield; population models; principles of optimal utilization of renewable resources (steady state); optimal harvesting under different property rights regimes; and African examples. Public goods and environmental externalities. pure and rival environmental public goods; Nash-Cournot equilibrium; Lindahl pricing and the Pareto-optimal provision of public goods; free-rider problem; game theory and the provision of public goods; and managing the commons; environmental externalities and derivation of policy instruments from Pareto-optimality. Policy framework for Natural resources utilization. Property rights regimes on optimal natural resource. Conservation and preservation, the economics of extinction, impacts of legal and illegal trade on wildlife species, economics of safe minimum standards and case studies from Africa. Environmental Policy Instruments and implementation. market-based instruments; (Taxes, fees and charges, Tradable permits); command and control; (Environmental standards, Extraction/harvesting quota, Equipment restrictions); and negotiations along Coase theorem; choice of environmental instruments (Weitzman model); handing of waste and recycling. Environmental Valuation and Analysis. value and welfare, valuation techniques: Hedonic Pricing; willingness-to-pay, cost-based techniques; Production Function-Based Techniques; Contingent Valuation; Choice Experiments; and Environmental impact assessment-an introduction. Environmental Accounting and practices. steps towards sustainability (the Solow-Hartwick model); resource use in a competitive world; consumption, income and wealth; measuring national income, information systems [the satellite accounts, and the modified of national income accounts]; national accounts; applications of green national accounts in Africa.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x 3 hr paper)

Learning and Teaching Enhancement Strategies

- Peer review of course outlines and teaching;
- Internal and external moderation of exam paper and scripts;
- Regular review of course content;
- Effective and efficient supervision and monitoring of assignments, tests and exams;
- Student evaluation.

SEMESTER 2:

F6932ME	APPLIED MARKETING AND PRICE ANALYSIS
Module Title:	Applied Marketing and Price Analysis
Module Code	F6932ME
NQF Level	9
Notional Hours	240
Contact hours	4 L + 2 P/wk
Additional learning requirements	None

NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to enhance the application of concepts and frameworks of agricultural marketing and price analysis to empirical research.

Module Content

Theoretical model of market structure and performance: Joint profit maximization, Quantity-setting model, Price-setting model, Conjectural variation, Dominant firm model, Leader-follower model, Game and industrial organization theories. Spatial and intertemporal market linkages: Intertemporal market linkages cobweb cycle, seasonal patterns and secular trends, futures markets and forward contracting, Spatial markets linkages, Transaction costs: types and dimensions, Spatial market integration models and Spatial equilibrium models. Horizontal and vertical integration of agricultural industries: Determinants of horizontal and vertical integration, Imperfect competition models, Successive monopoly model, Backward integration by a monopsony, Market integration and product differentiation and Policy implications. Market organizational form unique to agriculture: Farmer cooperatives, Model of a marketing/ processing cooperative, Competitive effect of cooperatives on imperfect markets; Farmer bargaining associations: Bilateral monopoly model; Marketing disorders, disturbances and policies. Price and approaches to the study of agricultural market organization, conduct and performance: Economic role of prices, Distributive and allocative functions and equilibrating functions with the market. Approaches to the study of agricultural market organization and performance: functional approach, commodity approach, institutional approach, managerial approach and Structure-conduct-performance paradigm.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x 3 hour paper)

F6932FE MEASURING AND MONITORING FOOD SECURITY

Module Title:	Measuring and Monitoring Food Security
Module Code	F6932FE
NQF Level	9
Notional Hours	120
Contact hours	2 L + 1 P/wk
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to understand the complexity of food security, required to monitor and measure for national food securities' decision making..

Module Content

Food insecurity (production, markets and socio-economic climate) and the global food economy. Household coping strategies and response to risk and shocks. Household dynamics (including livelihoods, purchasing behaviour and nutrition). Practical tools for programme and policy analysis and targeting. Evaluation of possible programme and policy options and their effectiveness in terms of achieving comprehensive and pro-poor growth. Sustainable Development goal 2 (end hunger), achieve food security and improved nutrition and promote sustainable agriculture. The household- food security measure, Household Food Security, why, how, what, of measuring a food security status; relate food security to members, the food security questionnaire, Best practice related to the identification, selection, presentation and analytical approaches to managing and analysing large datasets across multiple sectors to generate clear, concise findings for policymakers, Questions Included, screen Respondents. Implementing a food security scale and measurements Indicators, scores, indexes, Coding Survey Responses, Scale Values, Classifying Status levels, Missing Values measurement approaches, systems and analysis methods for multisectoral food security monitoring and evaluation limitations, Rasch-model software, practical examples Survey report content and requirement. Communicating food security information for decision makers.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x 3 hour paper)

F6932IE INSTITUTIONAL ECONOMICS

Module Title:	Institutional Economics
Module Code	F6932IE
NQF Level	9
Notional Hours	240
Contact hours	4 L + 2 P/wk
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to enhance the concepts institutional economics and how it relates to the agricultural sector.

Module Content

Institutional and behavioural economics. This module will expose students to the principles of the New Institutional Economics paradigm and how it can be utilized to improve the analysis of agricultural economic and agricultural development problems and issues. Major themes covered are: The agricultural development challenge: stylised features; new institutional economics: distinctive features and concepts; institutions and development: A historical and macro-perspective techno-economic characteristics and agricultural systems and products in poor countries; NIE analysis of markets and markets structures; the State: Political and institutional determinants of agricultural policy; collective action; transactions costs in smallholder agriculture; case studies.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x3 hr paper)

Year 2:

F6983TE THESIS

Module Title:	Thesis
Module Code	F6983TE
NQF Level	9
Notional Hours	1200
Contact hours	On appointment with supervisor(s)
Additional learning requirements	None
NQF Credits	120
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The purpose of this module is to provide graduates with advanced general acceptable scientific knowledge, skills and attitudes necessary for basic or applied research in Agricultural Economics.

Module Content

Students carry out supervised independent mini study of a current topic in Agribusiness, Agricultural economics and natural resources, or related field. The student will submit a final report written following guidelines for scientific writing, which should include but not limited to the following:

- Approved researchable topic
- Abstract
- Introduction /Background
- Literature review
- Methodology or Research Design
- Results and findings
- Discussion
- Conclusion and recommendation
- References based on APA (UNAM adopted format).
- Appendices (if any)

Student Assessment Strategies

As per the Higher Degrees Policy, Procedures and Regulations, a Master's thesis shall be submitted to at least two examiners recommended by the School Higher Degrees Board and approved by the Higher Degrees Committee for examination. At least one of the examiners in each case must be external to the University of Namibia, except when the student is a staff member in which case all examiners must be external. The supervisor(s) should not be one of the examiners. Following the Higher Degrees Policy, Procedures and Regulations, a 15% similarity level for Masters level is stated in the Higher Degrees policy (page 18, item F.1.19) Furthermore, the student shall also undergo a viva voce examination provided the thesis has received at least a PASS. Supervisors are not part of the viva voce examination panel. The student must pass both the thesis and the public viva voce examinations for the Higher Degree Committee to approve the results.

Quality Enhancement Strategies

These include the review of written proposal, scrutiny of the proposal via public presentations, seminars and conference presentations. Thesis examination by at least one external examiner, public viva voce examined by at least one external examiner and one internal examiner and the guidance by the supervisor(s). The student and supervisor(s) also submit progress reports every 4 months.

E-learning resources

Students will have access to the multidisciplinary databases in the library collection of electronic resources. Students will be given instructions during information literacy classes on how to find and access journal articles and eBooks that are pertinent to the various module content topics. The following are some notable databases: EBSCOhost, Emerald, Intech Open e-books, JSTOR, Knovel, Proquest, Pubmed online, Sage journals, Sabinet African Journals, Science Direct, Springer Link, Taylor & Francis, Vlebooks, Wiley online library

E.3.1.2 MASTERS IN ANIMAL BREEDING (31MSAB)

ADMISSION REQUIREMENTS

Candidates are eligible for admission to this programme if they meet the following criteria:

- Hold an Honours degree in a relevant field such as Animal Science, Animal Production, Rangeland Science or equivalent
- A minimum average mark of at least 60%

In addition to the above, final admission for all candidates shall be based on evaluation of submitted concept paper for the research study the prospective student intends to conduct. Such evaluation by the School Higher Degrees Board shall consider the feasibility of the proposed study as well as the availability of a qualified supervisory team within the school.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Postgraduate Students	9	16 non-contributing	L (4hr/wk)	None	C
F6911AR	Advanced Experimental Designs and Statistics	9	24	4L/2P	None	C
F6931AP	Sustainable Animal Production	9	24	4L/2P	None	C
F6921AE	Entrepreneurship in Livestock Production	9	12	2L/2P	None	C
Total Credits Semester 1						60
Year 1 Semester 2						
F6912AG	Advanced Animal Breeding	9	24	4L/2P	None	C
F6932AL	Statistical Methods in Animal Breeding	9	24	4L/2P	None	C
F6922AM	Molecular Techniques in Animal Breeding	9	12	2L/3P	None	C
Total Credits Semester 2.				60		
Total credits YEAR 1				120		
Year 2 Semester 1						
F6983AB	Thesis	9	60	On appointment with supervisor (s).	Advanced Experimental Designs and Statistics	C
Total credits YEAR2: Semester 1				60		

Year 2 Semester 2						
F6983AB	Thesis	9	60	On appointment with supervisor (s).	Advanced Experimental Designs and Statistics	C
Total credits YEAR2: Semester 2				60		
Total credits Year 2				120		
TOTAL CREDITS FOR THE PROGRAMME				**240**		

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6911AR	ADVANCED EXPERIMENTAL DESIGNS AND STATISTICS
Module Title:	Advanced Experimental Designs and Statistics
Module Code	F6911AR
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is: to equip students with the necessary knowledge and skills for effectively designing animal science experiments. It also aims to provide students with exposure to a wide range of univariate and multivariate statistical methods to enable them to proficiently utilize appropriate software for analyzing the data obtained from these experiments.

Module Content

Review of basic statistical concepts (data types, probability), data presentation, measures of central tendency and dispersion, probability and confidence intervals in relation to statements made about results of experiments and surveys; the importance of the normal, F-test and t-test in statistics; the sampling distribution of the mean and hypothesis testing, the concepts of sampling error and standard error, central limit theorem; confidence intervals. Standard Experimental Designs; Completely randomized design; Randomized block design; split-plot design, Latin square designs; factorial experiments; nested designs. Fixed, random and mixed effects, subsampling. The research process (defining the problem, literature review, stating clear objectives, hypotheses, methodology, statistical analysis); ethical issues in research. Design of experiments using the principles of replication, randomization, blocking and local control; Regression and correlation; assumption of linear regression; regression diagnostics; data transformations; multiple linear regression: Treating outliers, collinearity and scaling problems; General linear models (ANOVA, regression, analysis of covariance, repeated measures analysis, random, fixed, mixed effects). Comparison of treatment means: e.g. LSD, DMRT, Boniferoni, Turkey; Orthogonal contrasts. Explain the difference between comparison-wise and experiment-wise error rates, and discuss the advantages and disadvantages of the most popular multiple comparison tests. Polynomial regression, non-linear regression, types of curves e.g. exponential growth curves. Multivariate statistics: introduction to the nature of multivariate data and the range of interdependence techniques available for exploring and analyzing multivariate data sets, the concept of classification and explain analyses using the different cluster analysis techniques; the concept of gradient analysis using ordination techniques, indirect gradient analysis (e.g. Principal Components Analysis, Detrended Correspondence Analysis) and direct gradient analysis (e.g. Canonical Correlation Analysis) with practical examples. Non-Parametric Statistics: Introduce alternative tests to the parametric tests used in previous units, advantages and disadvantages of non-parametric tests (e.g. Wilcoxon, Kruskal-Wallis tests). Catagorical data analysis (chi-square tests, odds ratios, risk ratios, Mentahazel tests, Z- tests, logistic regression). Advanced data analysis using statistical software such as R, SAS, SPSS, MINITAB, Python. Data input and management; summarizing and graphing data; simple statistical tests; fitting linear and generalized linear models.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x3 hr paper)

F6931AP	SUSTAINABLE ANIMAL PRODUCTION
Module Title:	Sustainable Animal Production
Module Code	F6931AP
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
The purpose of this module is to: provide indepth insights into livestock production systems focusing on strengths, weaknesses, opportunities and threats and to develop sustainable and innovative solutions for the benefit of humanity, while paying attention to animal welfare concerns and climate change

Module Content
Overview of the agricultural structure in Namibian & Livestock production systems, Routine management of large, small ruminants and monogastrics; impact of climate change on livestock production; climate smart livestock production, sustainable livestock intensification, heat stress; farm infrastructure; grazing management; animal health and welfare; biosecurity measures; livestock value chain analysis, waste management and environmental control in livestock; management of equipment; organic agriculture; economics of livestock production, case studies in livestock policies.

Student Assessment Strategies

- Continuous Assessment: 50% (tests, case studies, projects, problem-solving based tasks, seminars)
- Exam: 50% (1 x3 hr paper)

F6921AE	ENTREPRENEURSHIP IN LIVESTOCK PRODUCTION
Module Title:	Entrepreneurship in Livestock Production
Module Code	F6921AE
NQF Level	9
Notional Hours	120
Contact hours	2 Lectures + 2 Tutorials / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
The purpose of this module is to: develop entrepreneurial-mind oriented graduates by imparting practical knowledge and skills and aptitudes to start, development and sustainably manage their agribusiness enterprises.

Module Content
Entrepreneurial concept; entrepreneurial creativity and innovation, sources of innovation in business, entrepreneurial opportunity, Agribusiness ideas generation tools and techniques, business opportunity identification. Feasibility Analysis of a livestock agribusiness: analyzing industry and markets, prototyping and validating a solution, developing and testing business model, identifying sources of business support and financing for start-ups, conducting market research, marketing plan, marketing strategy, marketing mix, calculating start-up capital requirement, financial analysis, value chain analysis, risk analysis. Livestock Business Design; business model canvass, business plan, livestock ethics, social responsibility in Agribusiness, choosing legal form of organization intellectual property, business registration and regulatory, business, tax management, agribusiness management principles and practices, agribusiness management functions, livestock products branding. Planning for Growth and Change; agribusiness funding, agribusiness growth and change. Agribusiness Management; agribusiness management principles and practices, agribusiness management functions, budgeting, record keeping and financial statements development, human resource management, financial management, risk management strategies of a livestock enterprise laws in livestock production; national animal health act, veterinary laws, animal welfare, animal products laws

Student Assessment Strategies
1. Continuous Assessment consist of: 50% (mini-projects, case studies), Written submission of business proposal (25%) and Oral presentation of business proposal (25%)).
2. To pass this module a student should obtain a continuous assessment minimum final mark of 50%

Semester two

F6912AQ	ADVANCED ANIMAL BREEDING
Module Title:	Advanced Animal Breeding
Module Code	F6912AQ
NQF Level	9
Notional Hours	240
Contact hours	4 lecture hours per week; 2 practical hours per week for one semester
Additional learning requirements	Article review and case study in animal breeding
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to: Equip students with principles and applications of quantitative genetics in animal breeding. Students will gain practical skills in the use of software tools for genetic evaluation, enabling estimation of breeding values which can be used in selection of superior animals for breeding..

Module Content
Population genetics (Hardy-Weinberg equilibrium, values and means, variance; linkage disequilibrium); gene substitution effects, genotypic values, breeding values, dominance deviations and interaction deviations; fixed versus random effects; derivation of expected mean squares; partitioning of phenotypic variance; prediction of response to selection; methods to estimate heritability; standard errors on heritability estimates; derivation of accuracy of selection for different sources of information; contemporary groups; genotype x environment interactions and their implications; genetic correlations; estimated breeding values; selection indices; crossbreeding and its genetic basis; composite breed development (using examples from dairy cattle, beef cattle, goats, sheep and poultry); linkage disequilibrium and its relevance to implementation of modern selection tools; genomic selection in livestock.

Student Assessment Strategies
Continuous Assessment: 50% (4 x assignments + 2 x tests + 1 case study/project).
Exam: 50% (1 x 3 hr paper)

F6932AL	STATISTICAL METHODS IN ANIMAL BREEDING
Module Title:	Statistical Methods in Animal Breeding
Module Code	F6932AL
NQF Level	9
Notional Hours	240
Contact hours	4 lecture hours per week; 2 practical hours per week for one semester
Additional learning requirements	Carry out 1 project
NQF Credits	24
(Co-requisites)	
Prerequisite	Advanced Experimental Designs & Statistics
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to:
Present models in animal breeding with emphasis on linear models for analysis of performance for different traits, variance component estimation and genetic evaluation methodologies of livestock data.

Module Content
Matrix algebra (addition, subtraction, multiplication, trace, rank, transpose, determinants and inverses, eigenvalues and eigenvectors, generalised inverses, Kronecker product, Hadamard product, idempontent matrix, solving simultaneous equations); General Linear regression (fixed and random effects, Simple linear regression, Least squares regression in matrix form, model assumptions and limitations, multiple linear regression); Linear Mixed Models (model equation, expectations and covariance structure, Generalised linear model); Animal models (numerator relationship matrix, inverse of the numerator relationship matrix, BLUP, single trait models, maternal trait models, repeated traits models, multiple trait models); Resampling methods in regression modelling (Boot strap, Cross validation); estimation (estimable functions, the Estimator and its properties, Error of estimation, Connectedness, Generalized least squares equations, The Best Linear Unbiased Estimators (BLUE)). Methods for solving equations (matrix inversion, iteration, Cholesky decomposition, conjugate gradient).

Maximum likelihood estimation (MLE); Restricted Maximum Likelihood Estimation (REML); Variance Component Estimation for animal models (e.g. using REMLF90 programs); estimation of genetic parameters (repeatability, heritability, genetic correlations); estimation of accuracy of estimated breeding values; data simulation; use of random regression models for test day data; Prediction of expected heterosis retention in rotational crossbreeding and composite populations; Selection indices; optional topics (growth curve modelling; threshold models; survival analysis); Calculating allele frequency, heterozygosity. . AMOVA, ADMIXTURE, STRUCTURE.

Student Assessment Strategies
Continuous Assessment: 50% (4 x assignments + 2 tests + 1 project/case study).
Exam: 50% (1 x 3 hr paper)

F6922AM	MOLECULAR TECHNIQUES IN ANIMAL BREEDING
Module Title:	Molecular Techniques in Animal Breeding
Module Code	F6922AM
NQF Level	9
Notional Hours	120
Contact hours	2 lecture hours per week; 1 practical hour per week for one semester
Additional learning requirements	Article review and case study in animal breeding
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to: Equip students with both theory and practical

Module Content
Introduction to molecular genetics in animal breeding; Recombinant DNA technology (gene transfer, transgenic animals, animal cloning); genetic diversity; Gene mapping; Major and minor genes; Quantitative Trait Loci (QTL); polymorphism; genetic markers (RFLPs, STR, PCR-SSCP, SNPs); Marker assisted selection (e.g. for foot root, meat tenderness, fecundity, E. coli infection); Marker assisted introgression; paternity testing; sexing of birds; Whole genome selection (WGS); detecting signatures

of selection; DNA extraction and amplification, Gene cloning and DNA sequencing; gene editing technology; Selection for traits expressed late in life (longevity, wool quality, milk quality and quantity); traits difficult to measure in live animals (carcass traits); disease resistance; heat stress. Conservation genetics applied to animal breeding (in situ and ex situ). Overview of the National Center for Biotechnology Information (NCBI) GenBank data base and how to deposit information on the database. Introduction to bioinformatics tools and software. Ethical, legal and social context of genomics.

Student Assessment Strategies
Continuous Assessment: 50% (1 review/case study; 4 practicals + 2 x tests).
Exam: 50% (1 x 3 hr paper)

SECOND YEAR

F6983AB THESIS

Module Title:	Thesis
Module Code	F6983AB
NQF Level	9
Notional Hours	120
Contact hours	2 lecture hours per week; 1 practical hour per week for one semester
Additional learning requirements	Article review and case study in animal breeding
NQF Credits	1200
(Co-requisites)	
Prerequisite	Advanced Experimental Designs and Statistics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The purpose of this module is to: Enable the student identify a researchable problem, write a proposal, carry out experiments, statistically analyse the data, make inferences, write a thesis and disseminate findings to a wider audience.

Module Content
A student, who has successfully completed the coursework phase, shall undertake research in an approved topic in Animal Breeding or Molecular Genetics; Animal Nutrition; Rangeland Resources & Pasture Science. A student must submit a research proposal in the second semester of the first academic year. A student can only officially register for the second year after acceptance of his/her research proposal by the Postgraduate Studies Committee.
The student under the guidance of the two academic advisors will collect and analyze data, write a thesis and make a presentation of the research findings before staff and students of the Faculty. The two academic advisors will assist the candidate to ensure integrity, correctness and completeness of the research. Students will be required to adhere to all ethical requirements, as approved by the Research Ethics committee of the University, of research work and processes during the course of study. Each MSc thesis should be accompanied by a certificate generated after running the document through a recognized plagiarism software e.g. Turn-It-In with a maximum similarity of 15%. After the thesis has been examined by an internal examiner, who must not be a supervisor, it will be sent for further examination by an external examiner. The student is expected to successfully present their thesis in a viva voce following the Rules and Regulations of the University of Namibia.

E.3.1.3 MASTER OF SCIENCE IN ANIMAL NUTRITION (31MSAN)

ADMISSION REQUIREMENTS

- The University of Namibia general regulations regarding admission of students to Master's Degree programmes shall apply.
- Notwithstanding the above, candidates wishing to enrol for this program must be in possession of a NQF level 8 Bachelor of Science (Honours) degree Agriculture in Animal Science or related fields in Animal Science from a recognized and accredited institution of higher learning, with a minimum of 60% average mark.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Postgraduate Students	9	16 non-contributing	L (4hr/wk)	None	C
F6911AR	Advanced Experimental Designs and Statistics	9	24	4L/2P	None	C
F6931AP	Sustainable Animal Production	9	24	4L/2P	None	C
F6921AE	Entrepreneurship in Livestock Production	9	12	2L/2P	None	C
Total Credits Semester 1						60
Year 1 Semester 2						
F6932AN	Advanced Ruminant Nutrition	9	24	4L/2P	None	C
F6952AA	Advanced Monogastric Nutrition	9	24	4L/2P	None	C
F6942AF	Feed Manufacturing & Technology	9	12	2L/2P	None	C
Total Credits Semester 2.				60		
Total credits YEAR 1				120		
Year 2 Semester 1						
F6983AB	Thesis	9	60	On appointment with supervisor (s).	Advanced Experimental Designs and Statistics	C
Total credits YEAR2: Semester 1				60		

Year 2 Semester 2						
F6983AB	Thesis	9	60	On appointment with supervisor (s).	Advanced Experimental Designs and Statistics	C
Total credits YEAR2: Semester 2				60		
Total credits Year 2				120		
TOTAL CREDITS FOR THE PROGRAMME				**240**		

MODULE DESCRIPTORS

FIRST YEAR

U6989LA ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS

Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6911AR	ADVANCED EXPERIMENTAL DESIGNS AND STATISTICS
Module Title:	Advanced Experimental Designs and Statistics
Module Code	F6911AR
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is: to equip students with the necessary knowledge and skills for effectively designing animal science experiments. It also aims to provide students with exposure to a wide range of univariate and multivariate statistical methods to enable them to proficiently utilize appropriate software for analyzing the data obtained from these experiments.

Module Content

Review of basic statistical concepts (data types, probability), data presentation, measures of central tendency and dispersion, probability and confidence intervals in relation to statements made about results of experiments and surveys; the importance of the normal, F-test and t-test in statistics; the sampling distribution of the mean and hypothesis testing, the concepts of sampling error and standard error, central limit theorem; confidence intervals. Standard Experimental Designs; Completely randomized design; Randomized block design; split-plot design, Latin square designs; factorial experiments; nested designs. Fixed, random and mixed effects, subsampling. The research process (defining the problem, literature review, stating clear objectives, hypotheses, methodology, statistical analysis); ethical issues in research. Design of experiments using the principles of replication, randomization, blocking and local control; Regression and correlation; assumption of linear regression; regression diagnostics; data transformations; multiple linear regression: Treating outliers, collinearity and scaling problems; General linear models (ANOVA, regression, analysis of covariance, repeated measures analysis, random, fixed, mixed effects). Comparison of treatment means: e.g. LSD, DMRT, Boniferoni, Turkey; Orthogonal contrasts. Explain the difference between comparison-wise and experiment-wise error rates, and discuss the advantages and disadvantages of the most popular multiple comparison tests. Polynomial regression, non-linear regression, types of curves e.g. exponential growth curves. Multivariate statistics: introduction to the nature of multivariate data and the range of interdependence techniques available for exploring and analyzing multivariate data sets, the concept of classification and explain analyses using the different cluster analysis techniques; the concept of gradient analysis using ordination techniques, indirect gradient analysis (e.g. Principal Components Analysis, Detrended Correspondence Analysis) and direct gradient analysis (e.g. Canonical Correlation Analysis) with practical examples. Non-Parametric Statistics: Introduce alternative tests to the parametric tests used in previous units, advantages and disadvantages of non-parametric tests (e.g. Wilcoxon, Kruskal-Wallis tests). Catagorical data analysis (chi-square tests, odds ratios, risk ratios, Mentahazel tests, Z- tests, logistic regression). Advanced data analysis using statistical software such as R, SAS, SPSS, MINITAB, Python. Data input and management; summarizing and graphing data; simple statistical tests; fitting linear and generalized linear models.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x3 hr paper)

F6931AP	SUSTAINABLE ANIMAL PRODUCTION
Module Title:	Sustainable Animal Production
Module Code	F6931AP
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: provide indepth insights into livestock production systems focusing on strengths, weaknesses, opportunities and threats and to develop sustainable and innovative solutions for the benefit of humanity, while paying attention to animal welfare concerns and climate change

Module Content

Overview of the agricultural structure in Namibian & Livestock production systems, Routine management of large, small ruminants and monogastrics; impact of climate change on livestock production; climate smart livestock production, sustainable livestock intensification, heat stress; farm infrastructure; grazing management; animal health and welfare; biosecurity measures; livestock value chain analysis, waste management and environmental control in livestock; management of equipment; organic agriculture; economics of livestock production, case studies in livestock policies.

Student Assessment Strategies

- Continuous Assessment: 50% (tests, case studies, projects, problem-solving based tasks, seminars)
- Exam: 50% (1 x3 hr paper)

F6921AE ENTREPRENEURSHIP IN LIVESTOCK PRODUCTION

Module Title:	Entrepreneurship in Livestock Production
Module Code	F6921AE
NQF Level	9
Notional Hours	120
Contact hours	2 Lectures + 2 Tutorials / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: develop entrepreneurial-mind oriented graduates by imparting practical knowledge and skills and aptitudes to start, development and sustainably manage their agribusiness enterprises.

Module Content

Entrepreneurial concept; entrepreneurial creativity and innovation, sources of innovation in business, entrepreneurial opportunity, Agribusiness ideas generation tools and techniques, business opportunity identification. Feasibility Analysis of a livestock agribusiness: analyzing industry and markets, prototyping and validating a solution, developing and testing business model, identifying sources of business support and financing for start-ups, conducting market research, marketing plan, marketing strategy, marketing mix, calculating start-up capital requirement, financial analysis, value chain analysis, risk analysis. Livestock Business Design; business model canvass, business plan, livestock ethics, social responsibility in Agribusiness, choosing legal form of organization intellectual property, business registration and regulatory, business, tax management, agribusiness management principles and practices, agribusiness management functions, livestock products branding. Planning for Growth and Change; agribusiness funding, agribusiness growth and change. Agribusiness Management; agribusiness management principles and practices, agribusiness management functions, budgeting, record keeping and financial statements development, human resource management, financial management, risk management strategies of a livestock enterprise laws in livestock production; national animal health act, veterinary laws, animal welfare, animal products laws

Student Assessment Strategies

1. Continuous Assessment consist of: 50% (mini-projects, case studies), Written submission of business proposal (25%) and Oral presentation of business proposal (25%)).
2. To pass this module a student should obtain a continuous assessment minimum final mark of 50%

SEMESTER TWO

F6932AN ADVANCED RUMINANT NUTRITION

Module Title:	Advanced Ruminant Nutrition
Module Code	F6932AN
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	Carry out 1 individual project
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to: provide in-depth understanding of the digestion and metabolism of nutrients, techniques of feed evaluation and diet formulation for improved ruminant animal production.

Module Content
Development of ruminant stomach, classification of ruminant animals (livestock & game) – bulk vs concentrate feeders, Rumen Microbes-Types and their role in utilization of feeds and forages; Interactions in the rumen: rumen ecosystem, microbial growth and nutrition, synthetic processes in the rumen and rumen digesta kinetics. Energy nutrition of rumen microorganisms, microbial interactions, pH and feed related effects, implications of anaerobiosis for energy nutrition of rumen micro-organisms, host animal control of urea recycling, control of outflow rates, control of post ruminal digestion, Absorption of nutrients, Utilization of absorbed nutrients, Energy metabolism of the host animal: basal and fasting metabolism, estimation of energy requirements (draught power, pregnancy, fat and protein accretion, lactation, wool and fibre production), Metabolizable energy (ME) system. Protein metabolism in the ruminant: Degradation of feed protein in the rumen, Quantification of protein degradability, Effects of rumen retention time and outflow rates, partitioning:-quickly degradable, slowly degradable, undegradable protein, Orskov equations on degradability, Level of feeding and degradability, microbial protein synthesis, Post ruminal protein digestion, importance of by-pass protein, methodologies for improving post ruminal protein supply, the metabolisable protein (MP) system. Nutritional and metabolic disorders in ruminants. Biotechnology in Animal Nutrition- Role of microbial feed additives, rumen fermentation metabolic modifiers, probiotics, ionophores, phytates and fibrolytic enzymes, reduction of enteric methane and carbon dioxide emissions. Anti-nutritional factors in animal feeds. Formulating rations for ruminants: Pearson Square method, Computer aided programme.

Student Assessment Strategies
Continuous Assessment: 50% (5 x seminar presentations + 2 tests + 1 project report).
Exam: 50% (1 x3 hr paper)

F6952AA	ADVANCED MONOGASTRIC NUTRITION
Module Title:	Advanced Monogastric Nutrition
Module Code	F6952AA
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	Carry out 1 individual project
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to: provide in-depth understanding of the digestion and metabolism of nutrients, techniques of feed evaluation and diet formulation for improved monogastric animal production.

Module Content
Current status of Monogastric Nutrition, Evaluation of the anatomy and physiology of digestive systems for monogastric animals. Overview of digestion and absorption in monogastric animals: proteins, carbohydrates, fats, minerals, vitamins, energy metabolism. Dietary nutrient supply and requirements of poultry and pigs. Measurements of nutrient bioavailability in poultry and pigs. Gut health and functionality in relation to nutrition for poultry and pigs. Health related effects of macronutrients and micronutrients. Analysis of dietary carbohydrate and its utilization in poultry and pigs. Nutrition for regulating oxidative stress and inflammatory response in monogastric. Measurement of energy status in monogastrics: glucose, non-esterified fatty acid, total lipids, beta-hydroxybutyrate, acetate and ketone bodies. Comparative digestion of fibrous diets (true monogastrics vs. hindgut fermenters). Fermentation capacity of the hindgut, stoichiometry and kinetics of fermentation, fibre requirements. The new energy systems in monogastrics, energy balance, efficiency of energy utilization, (DE-ME-NE). Calculation of ME Allowances: Maintenance, egg production, live weight gain, appetite limits, checking adequacy of ration. Nitrogen metabolism: Body protein pools in monogastrics, assessment of protein status, protein digestion and absorption, amino acid utilisation and requirements (limit amino acids in pig, poultry, rabbits), amino acids and energy ratios in poultry feeds, evaluation of protein quality, protein biosynthesis, protein-energy homeostasis. Lipids: Plant lipids - storage and deterioration, animal fats. Intake: digestibility, digestive flow, digestibility - modelling the digestive process, mathematics of turnover, rate of passage. Biotechnology in Monogastric Nutrition- Role of microbial feed additives, probiotics, phytates and enzymes for improved carbohydrate and protein digestion, and mineral uptake. Anti-nutritional factors in monogastric feeds. Major nutritional concepts used in formulating feed for monogastric animals: Pearson Square method, Computer aided programme. Formulating rations to meet desired levels of production, growing and fattening, egg production. Diseases management in monogastric animals, Waste management in monogastric production.

Student Assessment Strategies
Continuous Assessment: 50% (5 x seminar presentations + 2 tests + 1 project report).
Exam: 50% (1 x3 hr paper)

F6942AF	FEED MANUFACTURING AND TECHNOLOGY
Module Title:	Feed Manufacturing and Technology
Module Code	F6942AF
NQF Level	9
Notional Hours	120
Contact hours	2-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	Field visits to feed manufacturing companies

NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with a deeper knowledge and skills into the feed manufacturing process and their effects on feed quality and their feeding values..

Module Content

Feed ingredient characteristics (raw materials), types of processing methods commonly used in industrial production of feed (e.g. milling/grinding, pelleting, extrusion); feed mill and ingredient processing: milling process and effects on the utilization of nutrients and development of the digestive system; Feed mixing: mixing of feed ingredients, mixers, mixing uniformity and factors affecting mixing quality; Pelleting: pelleting process, assessment of pellet quality and factors affecting the pellet quality; importance of thermal processing of raw materials; Feed additives in the rations of livestock; carryover and cross contamination in livestock feed; feed processing plant layout (feed manufacturing operations sequence); Feed production technology and the economic implications of such production; on-farm feed manufacturing: harvesting, storage, mixing; feed safety and quality assurance: legislation, quality systems and assurance (HACCP and ISO standards in the feed industry), labelling and traceability. Physico-chemical properties of different livestock feeds: Ingredient quality (qualitative) - physical characteristics: sampling methods, colour, texture, odour and taste, particles size (screen analysis), shape, adulteration, damage and deterioration, bulk density, spot and quick chemical test. Ingredient quality (quantitative) - Protein quality and Amino acid composition. Carbohydrate quality and composition of feed (WSC, NDF, ADF, ADL). Lipid content and composition of fatty acids (PUFA), Mineral and Vitamin content of feed ingredients. Anti-nutritional factors: -extrinsic (contaminants): mycotoxins, aflatoxin, insects, weeds, insecticide, herbicides, fungicides. -intrinsic: allergins, protease inhibitors, antigenic proteins, phytic acid, lectins, phytoestrogens, glucosinolate, saponins, tannins, ricin, sinapine, gossypol, lipoxygenase. Ways of minimising antinutritional factors in feeds. Decomposition and rancidity test: acid value, peroxide value, etc. Maillard reactions and their importance. Feed processing: extrusion, grinding, cooling, crumbling, drying, pelleting, blending and effect on starches, proteins, fibre, fats, minerals, vitamins and feed additives. Feed additives: Additives (antibiotics, probiotics, enzymes, and flavours), effects on performance, physiological effects, and safety concerns. Ration formulation – Pearson Square Method, Computer Aided method. Feed Laws and Labelling.

Student Assessment Strategies

Continuous Assessment: 50% (5 x seminars + 2 tests + 1 project report).
Exam: 50% (1 x3 hr paper)

SECOND YEAR

F6983AB THESIS

Module Title:	Thesis
Module Code	F6983AB
NQF Level	9
Notional Hours	120
Contact hours	2 lecture hours per week; 1 practical hour per week for one semester
Additional learning requirements	Article review and case study in animal breeding
NQF Credits	1200
(Co-requisites)	
Prerequisite	Advanced Experimental Designs and Statistics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The purpose of this module is to: Enable the student identify a researchable problem, write a proposal, carry out experiments, statistically analyse the data, make inferences, write a thesis and disseminate findings to a wider audience.

Module Content

A student, who has successfully completed the coursework phase, shall undertake research in an approved topic in Animal Breeding or Molecular Genetics; Animal Nutrition; Rangeland Resources & Pasture Science. A student must submit a research proposal in the second semester of the first academic year. A student can only officially register for the second year after acceptance of his/her research proposal by the Postgraduate Studies Committee.

The student under the guidance of the two academic advisors will collect and analyze data, write a thesis and make a presentation of the research findings before staff and students of the Faculty. The two academic advisors will assist the candidate to ensure integrity, correctness and completeness of the research. Students will be required to adhere to all ethical requirements, as approved by the Research Ethics committee of the University, of research work and processes during the course of study. Each MSc thesis should be accompanied by a certificate generated after running the document through a recognized plagiarism software e.g. Turn-It-In with a maximum similarity of 15%. After the thesis has been examined by an internal examiner, who must not be a supervisor, it will be sent for further examination by an external examiner. The student is expected to successfully present their thesis in a viva voce following the Rules and Regulations of the University of Namibia.

E.3.1.4 MASTER OF SCIENCE IN RANGELAND RESOURCES & PASTURE SCIENCE (31MSAR)

ADMISSION REQUIREMENTS

- The University of Namibia general regulations regarding admission of students to Master's Degree programmes shall apply.
- Notwithstanding the above, candidates wishing to enrol for this program must be in possession of a NQF level 8 Bachelor of Science (Honours) degree Agriculture in Animal Science or related fields in Animal Science from a recognized and accredited institution of higher learning, with a minimum of 60% average mark.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Postgraduate Students	9	16 non-contributing	L (4hr/wk)	None	C
F6911AR	Advanced Experimental Designs and Statistics	9	24	4L/2P	None	C
F6931AP	Sustainable Animal Production	9	24	4L/2P	None	C
F6921AE	Entrepreneurship in Livestock Production	9	12	2L/2P	None	C
Total Credits Semester 1						60
Year 1 Semester 2						
F6972AR	Rangeland & Pasture Management	9	24	4L/2P	None	C
F6952AG	GIS & Remote Sensing in Rangeland Science	9	24	4L/2P	None	C
F6902AB	Rangeland Biodiversity & Conservation	9	12	2L/2P	None	C
Total Credits Semester 2.				60		
Total credits YEAR 1				120		
Year 2 Semester 1						
F6983AB	Thesis	9	60	On appointment with supervisor (s).	Advanced Experimental Designs and Statistics	C

Total credits YEAR2: Semester 1				60		
Year 2 Semester 2						
F6983AB	Thesis	9	60	On appointment with supervisor (s).	Advanced Experimental Designs and Statistics	C
Total credits YEAR2: Semester 2				60		
Total credits Year 2				120		
TOTAL CREDITS FOR THE PROGRAMME				**240**		

MODULE DESCRIPTORS

FIRST YEAR

U6989LA ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS

Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6911AR	ADVANCED EXPERIMENTAL DESIGNS AND STATISTICS
Module Title:	Advanced Experimental Designs and Statistics
Module Code	F6911AR
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is: to equip students with the necessary knowledge and skills for effectively designing animal science experiments. It also aims to provide students with exposure to a wide range of univariate and multivariate statistical methods to enable them to proficiently utilize appropriate software for analyzing the data obtained from these experiments.

Module Content

Review of basic statistical concepts (data types, probability), data presentation, measures of central tendency and dispersion, probability and confidence intervals in relation to statements made about results of experiments and surveys; the importance of the normal, F-test and t-test in statistics; the sampling distribution of the mean and hypothesis testing, the concepts of sampling error and standard error, central limit theorem; confidence intervals. Standard Experimental Designs; Completely randomized design; Randomized block design; split-plot design, Latin square designs; factorial experiments; nested designs. Fixed, random and mixed effects, subsampling. The research process (defining the problem, literature review, stating clear objectives, hypotheses, methodology, statistical analysis); ethical issues in research. Design of experiments using the principles of replication, randomization, blocking and local control; Regression and correlation; assumption of linear regression; regression diagnostics; data transformations; multiple linear regression: Treating outliers, collinearity and scaling problems; General linear models (ANOVA, regression, analysis of covariance, repeated measures analysis, random, fixed, mixed effects). Comparison of treatment means: e.g. LSD, DMRT, Boniferoni, Turkey; Orthogonal contrasts. Explain the difference between comparison-wise and experiment-wise error rates, and discuss the advantages and disadvantages of the most popular multiple comparison tests. Polynomial regression, non-linear regression, types of curves e.g. exponential growth curves. Multivariate statistics: introduction to the nature of multivariate data and the range of interdependence techniques available for exploring and analyzing multivariate data sets, the concept of classification and explain analyses using the different cluster analysis techniques; the concept of gradient analysis using ordination techniques, indirect gradient analysis (e.g. Principal Components Analysis, Detrended Correspondence Analysis) and direct gradient analysis (e.g. Canonical Correlation Analysis) with practical examples. Non-Parametric Statistics: Introduce alternative tests to the parametric tests used in previous units, advantages and disadvantages of non-parametric tests (e.g. Wilcoxon, Kruskal-Wallis tests). Catagorical data analysis (chi-square tests, odds ratios, risk ratios, Mentahazel tests, Z- tests, logistic regression). Advanced data analysis using statistical software such as R, SAS, SPSS, MINITAB, Python. Data input and management; summarizing and graphing data; simple statistical tests; fitting linear and generalized linear models.

Student Assessment Strategies

Continuous Assessment: 50% (5 x assignments + 2 tests + 1 project).
Exam: 50% (1 x3 hr paper)

F6931AP	SUSTAINABLE ANIMAL PRODUCTION
Module Title:	Sustainable Animal Production
Module Code	F6931AP
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: provide indepth insights into livestock production systems focusing on strengths, weaknesses, opportunities and threats and to develop sustainable and innovative solutions for the benefit of humanity, while paying attention to animal welfare concerns and climate change

Module Content

Overview of the agricultural structure in Namibian & Livestock production systems, Routine management of large, small ruminants and monogastrics; impact of climate change on livestock production; climate smart livestock production, sustainable livestock intensification, heat stress; farm infrastructure; grazing management; animal health and welfare; biosecurity measures; livestock value chain analysis, waste management and environmental control in livestock; management of equipment; organic agriculture; economics of livestock production, case studies in livestock policies.

Student Assessment Strategies

- Continuous Assessment: 50% (tests, case studies, projects, problem-solving based tasks, seminars)
- Exam: 50% (1 x3 hr paper)

F6921AE ENTREPRENEURSHIP IN LIVESTOCK PRODUCTION

Module Title:	Entrepreneurship in Livestock Production
Module Code	F6921AE
NQF Level	9
Notional Hours	120
Contact hours	2 Lectures + 2 Tutorials / Week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to: develop entrepreneurial-mind oriented graduates by imparting practical knowledge and skills and aptitudes to start, development and sustainably manage their agribusiness enterprises.

Module Content

Entrepreneurial concept; entrepreneurial creativity and innovation, sources of innovation in business, entrepreneurial opportunity, Agribusiness ideas generation tools and techniques, business opportunity identification. Feasibility Analysis of a livestock agribusiness: analyzing industry and markets, prototyping and validating a solution, developing and testing business model, identifying sources of business support and financing for start-ups, conducting market research, marketing plan, marketing strategy, marketing mix, calculating start-up capital requirement, financial analysis, value chain analysis, risk analysis. Livestock Business Design; business model canvass, business plan, livestock ethics, social responsibility in Agribusiness, choosing legal form of organization intellectual property, business registration and regulatory, business, tax management, agribusiness management principles and practices, agribusiness management functions, livestock products branding. Planning for Growth and Change; agribusiness funding, agribusiness growth and change. Agribusiness Management; agribusiness management principles and practices, agribusiness management functions, budgeting, record keeping and financial statements development, human resource management, financial management, risk management strategies of a livestock enterprise laws in livestock production; national animal health act, veterinary laws, animal welfare, animal products laws

Student Assessment Strategies

1. Continuous Assessment consist of: 50% (mini-projects, case studies), Written submission of business proposal (25%) and Oral presentation of business proposal (25%)).
2. To pass this module a student should obtain a continuous assessment minimum final mark of 50%

SEMESTER TWO

F6972AR RANGELAND AND PASTURE MANAGEMENT

Module Title:	Rangeland and Pasture Management
Module Code	F6972AR
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to: equip students with the relevant rangeland resources and pasture science field practical skills and the know-how of restoring, rehabilitating and managing of degraded rangelands and cultivated pastures.

Module Content

Eco-physiology of African rangelands, rangeland herbivorous interaction, rangeland management, carrying capacity, current land issues, range monitoring and evaluation, sustainable use of rangeland resources; Rangeland degradation and its mitigations: Defining rangeland degradation; causes of rangeland degradation; indicators of rangeland degradation; state of rangeland degradation in Sub-Saharan Africa; mitigating rangeland degradation; rangeland restoration and rehabilitation and reference ecosystem; the ecological trajectory; challenges and opportunities; problems of bush encroachment on rangeland pastures and methods of control; grazing management and methods for optimum utilization of range pastures, the importance of fire in the management of range forages and as a tool for control of bushes. review the different methods of pasture assessment emphasizing tropical rangeland pastures, e.g. pasture yield, pasture composition, estimating number, frequency and vegetation cover, basal area of a pasture, pasture structure, trees and shrubs (estimation of woody biomass). Students will also be exposed to practical activities at the farm at Neudamm and elsewhere within the country. The role of pastures in Agriculture; Germplasm exploration and preservation of native pasture species, description of common pasture species (grasses and legumes), Evaluation of natural resources for pasture production; climate-soil and plant interactions, Selection of tropical pastures species; criteria for selection for cultivation; cultivate, establish pasture and management in tropical areas; soil preparation methods, sowing time influence, planting methods, sowing rates/density, irrigation and fertilization application, weed and disease control; Production of pasture legume and grass seed; seed forage harvesting methods, forage processing and conservation methods; Seed quality control and testing; Estimation of forage production; Chemical composition and nutritive value of tropical grass and legumes; drought mitigation strategies and fodder flow planning.

Student Assessment Strategies

Continuous Assessment: 50% (2 tests; at least 1 written assignment; 2 practical reports; oral presentations).
Final Exam: 50% (1 x3 hour paper)

F6952AG	GIS & REMOTE SENSING IN RANGELAND SCIENCE
Module Title:	Gis & Remote Sensing in Rangeland Science
Module Code	F6952AG
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester
Additional learning requirements	Include any compulsory field trips / excursions (outside the normal practical's); attachments / group work / project etc.
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to acquaint students with the fundamental principles, methods, and applications of Geographic Information Systems (GIS) and Remote Sensing (RS) in the fields of Environmental Science and Management. This module also aims to develop students' practical skills in utilizing GIS and RS software..

Module Content

Basic introduction to the course GIS/RS in Rangeland Resources Management: The fundamentals of GIS and the components of a GIS. The nature of geographic data, and geo- referencing. Generalization, abstraction and metadata. Data models and data collection. Modeling the real world in a GIS environment. Review the main methods of GIS data capture and transfer; introduce essential practical management issues. Remote Sensing. Geographic query and analysis; turning data into information; basic introduction to spatial analysis; measurement, including algorithms to determine length, areas, shapes, slopes, and other properties of objects important for rangeland resources management. The concept of environment, natural resources, demography and land use. Major environmental concerns including pollution, soil degradation, and crop and livestock production, effects of agrochemicals, desertification and methods of control, natural and man-made hazards, human population growth, industrialization, urbanization, energy sources, waste management and recycling. Ecosystems management and modeling of habitat change. RS data sources, image pre-processing; basics of colour composite and creation; layer stacking, mosaicking, masking.

Student Assessment Strategies

Continuous Assessment: 50% (2 tests; at least 1 written assignment; 2 practical reports; case studies, mini-project, oral presentations).
Final Exam: 50% (1 x3 hour paper)

F6902AB	RANGE BIODIVERSITY AND CONSERVATION
Module Title:	Range Biodiversity and Conservation
Module Code	F6902AB
NQF Level	9
Notional Hours	240
Contact hours	4-hour lectures per week and 2-hour practical per week for a semester.
Additional learning requirements	Include any compulsory field trips / excursions (outside the normal practical's); attachments / group work / project etc
NQF Credits	24

(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to: to equip students with the necessary knowledge and practical skills to be able to sustainably manage and conserve rangeland biodiversity.

Module Content

Inventory, assessment and monitoring of rangeland biodiversity with particular emphasis on rangeland; review and discuss inventory assessment and monitoring approaches; discuss the importance of red data lists, their advantages and disadvantages. Valuation of rangeland biodiversity; categories of biodiversity, economic evaluation and applicability of various methods and approaches to rangeland resources. Bio-systematic considerations for conservation of rangeland biodiversity; ecological and taxonomic views of biodiversity and how they are linked. Conservation strategies and current issues. Conservation genetics: principles and procedures underlying various modern techniques of measuring genetic diversity; interpretation and use in conservation genetics. Local and international conventions on biodiversity (convention on biological diversity, United Nations Convention to Combat Desertification (UNCCD), Convention on International Trade on Endangered Species of Fauna and Flora (CITES).

Student Assessment Strategies

Continuous Assessment: 50% (2 tests; at least 1 written assignment; 2 practical reports; oral presentations).
Final Exam: 50% (1 x3 hour paper)

T.3.2 SECOND YEAR

F6983AB THESIS	
Module Title:	Thesis
Module Code	F6983AB
NQF Level	9
Notional Hours	120
Contact hours	2 lecture hours per week; 1 practical hour per week for one semester
Additional learning requirements	Article review and case study in animal breeding
NQF Credits	1200
(Co-requisites)	
Prerequisite	Advanced Experimental Designs and Statistics
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The purpose of this module is to: Enable the student identify a researchable problem, write a proposal, carry out experiments, statistically analyse the data, make inferences, write a thesis and disseminate findings to a wider audience.

Module Content

A student, who has successfully completed the coursework phase, shall undertake research in an approved topic in Animal Breeding or Molecular Genetics; Animal Nutrition; Rangeland Resources & Pasture Science. A student must submit a research proposal in the second semester of the first academic year. A student can only officially register for the second year after acceptance of his/her research proposal by the Postgraduate Studies Committee.

The student under the guidance of the two academic advisors will collect and analyze data, write a thesis and make a presentation of the research findings before staff and students of the Faculty. The two academic advisors will assist the candidate to ensure integrity, correctness and completeness of the research. Students will be required to adhere to all ethical requirements, as approved by the Research Ethics committee of the University, of research work and processes during the course of study. Each MSc thesis should be accompanied by a certificate generated after running the document through a recognized plagiarism software e.g. Turn-It-In with a maximum similarity of 15%. After the thesis has been examined by an internal examiner, who must not be a supervisor, it will be sent for further examination by an external examiner. The student is expected to successfully present their thesis in a viva voce following the Rules and Regulations of the University of Namibia.

E.3.1.5 MASTER OF PHILOSOPHY IN AGRICULTURAL ECONOMICS (31MPAE)

ADMISSION REQUIREMENTS

To be eligible for this MPhil, the candidate must have completed a bachelor honours degree at NQF level 8 or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
Some regional Southern African masters' programmes in Agricultural Economics show some deficiency in post graduate economic theory. Experience from international institutions showed that NQF 9 level candidate students require completion NQA level 8 preparatory modules in:

- Economic Theory and Policy
- Econometrics
- New Institutional Economics

Such modules' course work can be done through exchange arrangements with universities elsewhere or time spent at UNAM for these preparatory courses.
Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility, and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space.

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the Bachelors Honours for MPhil.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	9	16 (non-contributing)	4 hours per week	N/A	C
F6953ST	Thesis	9	240	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content
The module will cover the following:
Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.
Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.
Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6973AE THESIS (Agricultural Economics by research)

Module Title:	Thesis
Module Code	F6973AE
NQF Level	9
Notional Hours	2400
Contact hours	Face to face consultations with supervisor(s) on regular bases
Additional learning requirements	None
NQF Credits	240
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
This course is designed to broaden students' understanding of scientific principles in Agricultural Economics and its applications through extensive literature review and practical demonstration while carrying out original independent research. Students will be able to design, develop, conduct and manage major research projects independently, as well as document and present the results. Students are expected to make a novel contribution to the existing body of knowledge in Agricultural Economics.

Module Content
Students will present their findings in a written thesis. Poster and seminar presentations are encouraged. This module tests a student's ability to design and implement a research programme and communicate the findings to an informed audience in a comprehensive thesis, written in an appropriate scientific style. The timing of assessments and assessment deadlines have been planned to ensure that the volume of work is balanced throughout the programme. These do not only enable students to acquire in-depth practical training under the supervision of experienced research staff, but they also help to develop their capacity for independent investigation and report writing. Most projects are research-based although some data review, computer-based projects may be available. Individual research projects are undertaken during the year. This is carried out for a minimum period of 1 year for full-time students or 2 years for part-time students.

Student Assessment Strategies
The thesis describes the student's original research work with significant contribution to existing knowledge in the subject area. The thesis must be drafted in English language following scientific conventions. It is typically organized with the following sections: introduction, literature review, materials and methods, results, discussion. The thesis will be examined as per University Postgraduate guidelines. An internal and external examiner of the thesis is appointed. If the student is a staff member, then all examiners are external. The UNAM grading system will be used for the evaluation. Each student will defend the thesis in a viva voce examination. Refer to the University Postgraduate guidelines for detailed information.

E.3.1.6 MASTER OF PHILOSOPHY IN ANIMAL SCIENCE (31MPAS)

ADMISSION REQUIREMENTS

To be eligible for this MPhil programme, the candidate must have completed a bachelor honours degree at NQF level 8 in Bachelor of Science (Honours) degree Agriculture in Animal Science or related fields in Animal Science from a recognized and accredited institution of higher learning, with a minimum of 60% average mark.
Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
Along with the application, candidates need to submit a detailed research concept note highlighting their proposed area of research, objectives, methodology and a review of existing literature.
The research concept note will be evaluated for relevance, novelty, feasibility and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space.

Additional Selection Criteria
Based on space availability, the final selection for qualifying candidates may be based additional criteria such as equity considerations or high score/percentage obtained in the Bachelors honours degree.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	9	16 (non-contributing)	4 hours per week	N/A	C
F6933AT	Thesis	9	240	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content
The module will cover the following:
Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.
Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.
Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6933AT	THESIS
Module Title:	Thesis
Module Code	F6933AT
NQF Level	9
Notional Hours	2400
Contact hours	Face to face consultations with supervisor(s) on regular bases
Additional learning requirements	None
NQF Credits	240
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
This course is designed to broaden students' understanding of scientific principles in Animal Science and its applications through extensive literature review and practical demonstration while conducting original independent research. Students will be able to design, develop, conduct, and manage significant research projects independently and document and present the results. Students are expected to make a contribution to the existing body of knowledge in Animal Science.

Module Content
Core elements of the course include the support of academic skills such as:

- Literature survey: Comprehensive compilation of literature survey of studies and recent development in the area of study. The review should be presented in chronological sequence in line with study objectives. This is essential towards development and submission of a logical research proposal. Students shall be encouraged to access both paper-based and online databases, abstracts and articles relevant to the proposed research title.
- Development of research title: The outcome of the literature survey will inform the student under the guidance of the supervisor of the need to amend (if necessary) the title of research based on findings, intended scope of work and relevance of the research to the society, scientific, technological and industrial development. Ability to transform the conceptualised research idea into a proposal through proposal writing process in a coherent and chronological manner forms the basis of this learning stage. Presentation of the fully developed proposal before a departmental panel consisting of academic staff and students.
- Implementation of the approved research proposal: At this stage, the student will implement the proposal through the stated research methodology/experimental process. Here, the student will demonstrate the ability to conduct independent research work under the guidance of a supervisor. Where an ethical clearance is required, the student will be required to apply for the research ethics certificate following the procedures of the University and the student should seek assistance from the supervisor if challenges are encountered with ethical clearance issues.
- Data presentation, interpretation and discussion: Skills and ability to apply relevant statistical analysis for data presentation and sound scientific and technical interpretation and discussion of the results will be displayed.
- Scientific writing and Presentation skills: Students' written, and oral presentation skills will be put to test and improved in the process. Here, ability to summarise a report e.g. synthesis, writing of abstract, conclusion and recommendations will be evaluated. Knowledge of the student in preparing research outcomes for scientific communication (draft manuscript, PowerPoint presentation) will be accessed.
- Writing and submission of thesis for assessment: Compiling all the different sections of the research work into coherent chapters in the form of a thesis following the format of the Postgraduate Studies of the University.
- Ethical procedures: Students will be required to adhere to all ethical requirements as approved by the University's Research Ethics Committee, including research work and processes during study. Each MPhil thesis should be accompanied by a certificate generated after running the document through a recognized plagiarism software, e.g. Turn-it-in, with a maximum similarity of 15%.
- Formal presentation of thesis: Students are expected to successfully present their thesis in a viva voce following the Rules for Postgraduate Studies.
- Development of a manuscript for publication in accredited journals

Student Assessment Strategies
Progress reports will be submitted at six-month intervals to assess progress and challenges which may require attention. On programme completion, the student will be assessed through a thesis, which documents the student's independent research work with significant contribution to existing knowledge in the subject area, as well as through a viva voce examination which provides opportunity for oral presentation and defence of a student's thesis. The thesis will be examined by an internal examiner from UNAM and an external examiner in accordance with the UNAM postgraduate grading system and timelines.

E.3.1.7 DOCTOR OF PHILOSOPHY IN AGRICULTURAL ECONOMICS (31PHAE)

ADMISSION REQUIREMENTS

To be eligible for this PhD programme, the candidate must have completed a master's degree in agricultural economics at NQF level 9 from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA). PhD students require similar levels of theory such as the UNAM NQA level 9 programme MSc in Agricultural economics. Students without required entry theory can follow modules through exchange arrangements in collaboration with the School of Business Management, Governance and Economics, elsewhere or completing existing UNAM modules as preparatory requirement. Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility, and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space.

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the Master's for PhD qualification.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	10	16 (non-contributing)	4 hours per week	N/A	C
F7073AE	Dissertation	10	360	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	10
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F7073AE	DISSERTATION
Module Title:	Dissertation
Module Code	F7073AE
NQF Level	10
Notional Hours	3600
Contact hours	As per the arrangement with supervisor(s)
Additional learning requirements	Without NQF level 8 modules in microeconomics, macro-economics, econometrics, and new institutional economics, these must provide prior to the research
NQF Credits	360
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
This module is designed to broaden students' understanding of scientific principles in Agricultural Economics and its applications through extensive literature review and practical demonstration while carrying out original independent research. Students will be able to design, develop, conduct, and manage major research projects independently, as well as document and present the results. Students are expected to make a unique contribution to the existing body of knowledge in Agricultural Economics.

Module Content
Students will present findings in a written dissertation. Seminar presentations are encouraged. This will test a student's ability to design and implement a research programme and communicate the findings to an informed audience in a comprehensive dissertation, written in an appropriate scientific style. The timing of assessments and assessment deadlines have been planned to ensure that the volume of work is balanced throughout the programme. Most projects are research-based on data, computer-based projects, etc. Individual research is undertaken during the first and second year. This is carried out for a minimum period of 2 year for full-time students or 4 years for part-time students.

Student Assessment Strategies
The dissertation describes the student's original research work with significant contribution to existing knowledge in the subject area. The dissertation must be drafted in English language following scientific conventions. It is typically organized with the following sections: introduction, literature review, materials and methods, results, discussion. The dissertation will be examined as per University Postgraduate guidelines. Internal and external examiners for the dissertation will be appointed. If the student is a staff member, then all examiners are external. The UNAM grading system will be used for the evaluation. Each student will defend the promotion in a viva voce examination. Refer to the University Postgraduate guidelines for detailed information.

E.3.1.8 DOCTOR OF PHILOSOPHY IN ANIMAL SCIENCE (31PHAS)

ADMISSION REQUIREMENTS

The minimum admission requirements into the PhD in Animal Science programme:

- Master of Science in Animal Science, or equivalent qualification from a reputable institution of higher learning
- Master of Philosophy in Animal Science or equivalent qualification from a reputable institution of higher learning
- Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
- In addition to the above, final admission for all candidates shall be based on evaluation of submitted concept paper for the research study the prospective student intends to conduct. Such evaluation by the School Higher Degrees Board shall consider the feasibility of the proposed study as well as the availability of qualified supervisory team within the school.'

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the Master's for PhD qualification.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	10	16 (non-contributing)	4 hours per week	N/A	C
F7073AD	Dissertation	10	360	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	10
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F7073AD DISSERTATION	
Module Title:	Dissertation
Module Code	F7073AD
NQF Level	10
Notional Hours	3600
Contact hours	As per the arrangement with supervisor(s)
Additional learning requirements	Without NQF level 8 modules in microeconomics, macro-economics, econometrics, and new institutional economics, these must provide prior to the research
NQF Credits	360
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The purpose of this module is to equip students with knowledge in research, analytical skills and competencies that will make them specialists in their chosen field of animal science.

Module Content
Core elements of the course include the support of academic skills such as:

- Literature review: Comprehensive compilation of literature survey of studies and recent development in the area of study. The review should be presented in chronological sequence in line with study objectives. This is essential towards development and submission of a logical research proposal. Students shall be encouraged to access both paper-based and online databases, abstracts and articles relevant to the proposed research title.

- Development of research title: The outcome of the literature survey will inform the student under the guidance of the supervisor/s of the need to amend (if necessary) the title of research based intended scope of work and relevance of the research to the society, scientific, technological and industrial development. Ability to transform the conceptualised research idea into a proposal through proposal writing process in a coherent and chronological manner forms the basis of this learning stage. Oral presentation of the fully developed proposal before a departmental panel consisting of academic staff and students forms part of this learning stage.

- Implementation of the acceptable and approved research proposal (methodology/experimental process): At this stage, the student will implement the proposal through the stated methodology/experimental process. The student will demonstrate the ability to conduct independent research work under the guidance of a supervisor/s. Where an ethical clearance is required, the student should apply for the research ethics certificate following the procedures of the university and the student should seek assistance from the supervisor/s if challenges are encountered with ethical clearance issues.

- Data presentation, interpretation and discussion: Skills and ability to apply relevant statistical analysis for data presentation and sound scientific and technical interpretation and discussion of the results will be displayed.

- Scientific writing and Presentation skills: Students' written, and oral presentation skills will be put to the test and improved in the process. Here, the ability to summarise a report e.g. synthesis, writing of abstract,

conclusion and recommendations will be evaluated. Knowledge of the student in preparing research outcomes for scientific communication (draft manuscript, PowerPoint presentation) will be assessed.

- Writing and submission of dissertation for assessment: The compilation of all the different sections of the research work into coherent chapters in the form of a dissertation following the Postgraduate Studies format of the University will be assessed.

- Ethical procedures: Students will be required to adhere to all ethical requirements as approved by the Research Ethics committee of the University, of research work and processes during the course of study. Each PhD dissertation should be accompanied by a certificate generated after running the document through a recognized plagiarism software e.g. Turn-It-In with a maximum similarity of 15%.

- Formal presentation of dissertation: Students are expected to successfully present their theses in a viva voce following the Rules for Postgraduate Studies.

Student Assessment Strategies

Progress reports will be submitted at six-month intervals to assess progress and challenges which may require attention. On programme completion, the student will be assessed through a dissertation, which documents the student's independent research work with significant contribution to existing knowledge in the subject area, as well as through a *viva voce* examination which provides opportunity for oral presentation and defence of a student's dissertation. The dissertation will be examined by an internal examiner from UNAM and an external examiner in accordance with the UNAM postgraduate grading system and timelines.

E.3.2.1 MASTER OF SCIENCE IN MARINE SCIENCE (LEVEL 9) (31MSMS)

ADMISSION REQUIREMENTS

The minimum requirement for admission to the Master of Science in Marine Science program is a Bachelor of Science (Honours) degree in Fisheries and Ocean Sciences, Marine Biology, or equivalent qualifications from related fields. Candidates must have achieved a minimum average of 60%.

Additional Selection Criteria
Candidate selection will be based on the grade average from their NQF level 8 qualification, with preference given to higher grade averages. If qualified applicants exceed available places, a test may be administered.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Prerequisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Postgraduate Students	9	16 non-contributing	L (4hr/wk)	None	C
F6951IC	Data analysis and Modelling	9	24	4L / 3P	None	**C**
F6971IB	Marine Biodiversity and Conservation	9	24	4L / 3P	None	**C**
F6961IA	Blue Economy and Ocean Governance	9	12	2L /2P	None	**C**
Total Credits Semester 1						60
Year 1 Semester 2 (A student MUST choose one elective)						
F6962IE	Ecosystem-based Climate Adaptations	9	12	2L/ 2P	None	**C**
F6912IJ	Ocean and Coastal Pollution Management	9	24	4L / 3P	None	**C**
F6972ID	Population Dynamics of Aquatic Resources	9	24	4L / 3P	None	**E**
F6912IK	Aquatic Biocultivation	9	24	4L / 3P	None	**E**
F6932IJ	Dynamics of Marine Food Webs	9	24	4L / 3P	None	**E**
F6912IM	Marine Biogeochemistry and Oceanography	9	24	4L / 3P	None	**E**
Total Credits Semester 2						**60**
Total credits YEAR 1						**120**

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Prerequisites	Compulsory (C) / Elective (E)
Year 2 Semester 1 & 2						
F6983II	Thesis	9	120	L (4hr/wk) P (3hr/wk)	None	C
Total Credits Semester 1 & 2			**120**			
TOTAL CREDITS FOR THE PROGRAM:			**240**			

MODULE DESCRIPTORS

FIRST YEAR

U6989LA ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS

Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6951IC	DATA ANALYSIS AND MODELLING
Module Title:	Data Analysis and Modelling
Module Code	F6951IC
NQF Level	9
Notional Hours	240
Contact hours	4 x 1 h / week per semester Practical: 1 x 3 h / week per semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide students with the necessary tools and principle techniques for data analysis and modelling required for research in Fisheries Science and Oceanography..

Module Content

Biological Data Management: Data Cleaning, Data Handling and Data Visualization and manipulation and visualization in the language and environment for statistical computing and graphics R; Statistical Foundations and Hypothesis Testing: Testing for Normality, Test Selection, Hypothesis Formulation; Experimental Design: Completely Randomized Design, Blocking Design; Inferential Tools for Research Validation: Confidence Intervals, - p-Values and others; Data Collection and Field Work: Field Sampling Methods, Experimental Stages; Advanced Hypothesis Testing: Parametric Tests (t-test, ANOVA), Non-Parametric Tests (Chi-square, Kruskal-Wallis test), Statistical Software Packages; Multivariate Statistical Techniques: Principal Component Analysis (PCA), Cluster Analysis; Bootstrapping Methods: Resampling Techniques, Confidence Intervals; Generalized Linear Models (GLM) and Generalized Additive Models (GAM): GLM and GAM Implementation; Model Selection Techniques: Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC)

Student Assessment Strategies

Continuous evaluations through online quizzes. Presentation of results (one written and one oral assignment) (altogether 60%). One practical exam (1 x 3 h paper) (40% of final mark). The pass mark of this module is 50%.

F6971IB	MARINE BIODIVERSITY AND CONSERVATION
Module Title:	Marine Biodiversity and Conservation
Module Code	F6971IB
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1 h /week per semester. Practical/tutorial: 1 x 3 h / week per semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide students with an in-depth understanding of the diverse forms of life in marine ecosystems, emphasizing the functional roles these organisms play in ecosystem processes.

Module Content

Introduction to Marine Biodiversity: Concepts, importance, and global patterns; Biodiversity in Marine Ecosystems: Exploration of the variety of life in different marine ecosystems; Role of Biodiversity in Ecosystem Functioning: Understanding the relationships between biodiversity and ecosystem processes; Biodiversity and Ecosystem Services: Examination of how biodiversity supports the provision of ecosystem services; Impacts of Environmental Changes on Marine Biodiversity: Assessment of how climate change, ocean acidification, etc., are affecting marine biodiversity; Human Impacts on Marine Biodiversity: Overfishing, pollution, habitat destruction, and other impacts; Conservation of Marine Biodiversity: Strategies for protecting marine biodiversity and maintaining ecosystem health and resilience.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes:

- at least 4 practicals (30%)
- al least 1 Field report 1 (20 %)
- at least 2 tests (40%),
- a seminar presentation (10%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6951IC	DATA ANALYSIS AND MODELLING
Module Title:	Data Analysis and Modelling

Module Code	F6951IC
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1 h / week per semester Practical: 1 x 3 h / week per semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide students with the necessary tools and principle techniques for data analysis and modelling required for research in Fisheries Science and Oceanography.

Module Content

Biological Data Management: Data Cleaning, Data Handling and Data Visualization and manipulation and visualization in the language and environment for statistical computing and graphics R; Statistical Foundations and Hypothesis Testing: Testing for Normality, Test Selection, Hypothesis Formulation; Experimental Design: Completely Randomized Design, Blocking Design; Inferential Tools for Research Validation: Confidence Intervals, - p-Values and others; Data Collection and Field Work: Field Sampling Methods, Experimental Stages; Advanced Hypothesis Testing: Parametric Tests (t-test, ANOVA), Non-Parametric Tests (Chi-square, Kruskal-Wallis test), Statistical Software Packages; Multivariate Statistical Techniques: Principal Component Analysis (PCA), Cluster Analysis; Bootstrapping Methods: Resampling Techniques, Confidence Intervals; Generalized Linear Models (GLM) and Generalized Additive Models (GAM): GLM and GAM Implementation; Model Selection Techniques:

Student Assessment Strategies

Continuous evaluations through online quizzes. Presentation of results (one written and one oral assignment) (altogether 60%). One practical exam (1 x 3 h paper) (40% of final mark). The pass mark of this module is 50%.Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC)

F6971IB MARINE BIODIVERSITY AND CONSERVATION

Module Title:	Marine Biodiversity and Conservation
Module Code	F6971IB
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1 h /week per semester. Practical/tutorial: 1 x 3 h / week per semester
Additional learning requirements	Participation in at least one cruise, study workshop, or conducting a case study is required.
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide students with an in-depth understanding of the diverse forms of life in marine ecosystems, emphasizing the functional roles these organisms play in ecosystem processes

Module Content

Introduction to Marine Biodiversity: Concepts, importance, and global patterns; Biodiversity in Marine Ecosystems: Exploration of the variety of life in different marine ecosystems; Role of Biodiversity in Ecosystem Functioning: Understanding the relationships between biodiversity and ecosystem processes; Biodiversity and Ecosystem Services: Examination of how biodiversity supports the provision of ecosystem services; Impacts of Environmental Changes on Marine Biodiversity: Assessment of how climate change, ocean acidification, etc., are affecting marine biodiversity; Human Impacts on Marine Biodiversity: Overfishing, pollution, habitat destruction, and other impacts; Conservation of Marine Biodiversity:

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes:

- at least 4 practicals (30%)
- al least 1 Field report 1 (20 %)
- at least 2 tests (40%),
- a seminar presentation (10%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.
iodiversity and maintaining ecosystem health and resilience.

F6961IA BLUE ECONOMY AND OCEAN GOVERNANCE

Module Title:	Blue Economy and Ocean Governance
Module Code	F6961IA
NQF Level	9
Notional Hours	120
Contact hours	Lectures: 2 x 1 h /week per semester. Tutorials: 1 x 2 h / week per semester

Additional learning requirements	Participation in at least one cruise, study workshop, field visit, or the conduct of a case study is required.
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of this module is to provide students with a comprehensive understanding of the concept of the Blue Economy and its interplay with the principles of Ocean Governance, providing students with the knowledge and tools to harness the oceans' resources sustainably and equitably.

Module Content

Introduction to the Blue Economy: Definition and significance of the Blue Economy, Evolution from traditional marine economies, Key sectors within the Blue Economy; Historical Context and Evolution of Ocean Governance: The age of exploration and the first maritime laws, Modern challenges and the rise of comprehensive governance; The Ecological Importance of Oceans: Marine ecosystems and their role in global ecology; Environmental Threats to the Ocean: Overfishing and its impact; Marine pollution (plastics, oil spills, and heavy metals); Climate change and oceanic consequences: Acidification, sea-level rise, temperature rise; Economic Potential and Challenges: Sustainable fisheries and aquaculture; Renewable ocean energy: Wind, tidal, and wave energy, Marine biotechnology and its future; Deep sea mining; Marine tourism and recreation; Socio-cultural Impacts and Considerations: The role of coastal communities in the Blue Economy; Preservation of maritime heritage and culture; Indigenous knowledge and its importance in marine sustainability; Key Principles of Ocean Governance: International conventions and treaties (UNCLOS and beyond); Maritime boundaries and zones (Exclusive Economic Zones, High Seas, territorial seas); The "Common Heritage of Mankind" principle; Case Studies in Ocean Governance: Marine protected areas; Conflicts and resolutions in shared waters, Innovative solutions in sustainable marine development; Ethical Dimensions and Equity in the Blue Economy: Equitable sharing of marine resources; Addressing exploitation in the marine sector; Conservation vs. commercialization debates; The Future of the Blue Economy: Emerging technologies and their implications (e.g., deep-sea mining, AI in oceanography); Global cooperation and the path towards a sustainable marine future; The role of the private sector and public-private partnerships.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes:

- 2 tests (40%)
- 2 assignments (40%), and
- a seminar presentation (20%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6972ID POPULATION DYNAMICS OF AQUATIC RESOURCES

Module Title:	Population Dynamics of Aquatic Resources
Module Code	F6972ID
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1 h / week per semester. Practical/Tutorial: 1 x 3 h / week per semester
Additional learning requirements	Participation in hands-on laboratory activities, field-based practicals, or marine cruises is required.
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with a comprehensive understanding of numerical analysis of population dynamics of aquatic populations and knowledge for the assessment and management of exploitation of renewable resources and marine conservation strategies.

Module Content

Introduction: Overview of fish diversity, Fish behaviour and sensory systems; Ecology of Fish: Habitat selection and migration; Feeding ecology and trophic interactions; Reproduction and life history strategies; Population Dynamics: Expand on concepts of population growth, recruitment, and mortality including advanced modelling; Quantitative Methods in Fish Population Assessment: Sampling methods for fish populations, Estimation of population size and age structure, Growth models and age-at-length data; Stock Assessment Models: Use of deterministic and stochastic models, e.g. statistical catch-at-age analysis; Impact of Fishing and Environmental Factors: Fishing mortality and overfishing; Environmental impacts on fish populations; Climate change and fish populations; Fisheries Management: Stock assessment and management strategies including reference points, Conservation and protected areas; In-situ sampling techniques on research vessels: e.g. plankton nets, fishing gear, hydroacoustic recordings, optical underwater sampling techniques; Additional laboratory techniques: e.g. sample analysis, body composition analysis, otolith interpretation with daily and annual structures; Experiments on the effects of biotic (food quality and quantity, competition) and abiotic factors (temperature, salinity, oxygen content, acidification) on growth of juvenile and adult fish; Mathematical models of biological processes and populations: e.g. Sampling methods

for fish populations; analysing results of tagging studies; length-frequency analysis; bootstrapping growth; model comparisons and model selection; Mathematical stock assessment models: Use of deterministic and stochastic models, e.g. yield-per-recruit models, age-structured models; Uncertainty in Assessments: Describe and account for model uncertainties; Case Studies: Examination of real-world fisheries stock assessments, their outcomes, and management implications.

Student Assessment Strategies
The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes at least 4 assessed practicals, one written assignment, and an oral presentation (seminar or podcast). The summative assessment, which is the end-of-semester practical examination, will contribute 60% to the module grade (1 x 3-hour theory paper). The pass mark for the module is 50%.

F6962IE	ECOSYSTEM-BASED CLIMATE ADAPTATIONS
Module Title:	Ecosystem-Based Climate Adaptations
Module Code	F6962IE
NQF Level	9
Notional Hours	120
Contact hours	Lectures: 2 x 1 h / week per semester. Practical: 1 x 2 h / week per semester
Additional learning requirements	Participation in at least one field-based practical, workshop, or marine cruise is required.
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to provide students an in-depth understanding of ecosystem-based approaches to climate adaptation in marine environments. This module will explore the intertwined relationship between marine ecosystems and climate change, emphasizing the application of natural solutions and marine biodiversity to build resilience and adapt to changing conditions.

Module Content
Introduction to Marine Ecosystems and Climate Interplay: Background of marine ecosystems and their global significance, The impact of historical and current climate change on marine environments, The concept of ecosystem-based adaptation (EBA) and Nature based solutions; Marine Ecosystem Services and Their Climate Relevance: Classification of marine ecosystem services (provisioning, regulating, supporting, and cultural), The value and importance of marine ecosystem services, Climate threats to marine ecosystem services; Mangroves, Coral Reefs, and Seagrasses (Frontline Defenders): Characteristics and functions of mangroves (Natural buffers against storm surges, Carbon sequestration capacities), Coral reefs as biodiversity hotspots (Ecological importance, Climate threats and adaptation methods), Seagrass meadows and their ecological roles (Benefits for fisheries, carbon storage, Restoration and conservation efforts); Biodiversity: The Underpinning of Resilient Marine Systems (Importance of marine biodiversity in maintaining ecosystem health), Threats to marine biodiversity (Overfishing, pollution, habitat destruction), Biodiversity as a tool for climate resilience; Socioeconomic Aspects of Ecosystem-Based Climate Adaptation: Impacts of marine ecosystem degradation on coastal communities, Socioeconomic benefits of healthy marine ecosystems, Community-based and participatory approaches in EBA; Policy Frameworks and Global Case Studies: Review of international marine conservation treaties and conventions, Role of policies in promoting and supporting EBA, Real-world examples of successful EBA strategies from around the world; Emerging Technologies and Their Role in Marine Ecosystem-based Adaptation: Overview of technology's role in marine conservation, Introduction to GIS, remote sensing, and other tools in EBA, Future prospects (AI, drones, and more in marine conservation).

Student Assessment Strategies
The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes:
2 practicals (45%), 2 tests (45%) and 1 written assignment (10%)
The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6912IK	AQUATIC BIOCULTIVATION
Module Title:	Aquatic Biocultivation
Module Code	F6912IK
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1hr/week per semester. Practical: 1 x 3 hr. Alternate week per semester
Additional learning requirements	Participation in at least one study workshop, field visit, or the conduct of a case study is required.
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to provide students with a comprehensive understanding of aquatic cultivation, spanning marine flora to aquatic fauna; and insights into marine bioproduction's pivotal role in global ecology, food security, and the Economy-changing conditions.

Module Content
Introduction to Aquatic Cultivation: Historical evolution of marine farming, Global significance of cultivating marine flora and fauna; Marine Flora Cultivation Techniques: Cultivating diverse marine plants, including seaweeds and microalgae, Applications(biofuels, pharmaceuticals, and nutraceuticals); Biology of Ichthyofauna: Life cycles, physiology, and biology of key marine animals, Mariculture techniques, challenges, and innovations; Ecological Impact of Aquatic Cultivation: Environmental effects of marine farming, Strategies for sustainable cultivation and minimizing the ecological footprint; Innovations in Aquatic Cultivation: Biotechnology in yield enhancement, genetics, automation, and artificial intelligence in marine farming; Economic Aspects of Marine Cultivation: Global economic landscape of the marine cultivation industry, Socioeconomic effects on coastal communities; Health, Nutrition, and Marine Produce: Nutritional advantages of marine-derived foods, Biosecurity, health management, and food safety in marine cultivation; Regulatory Frameworks in Marine Cultivation: International and national policies shaping marine farming, Ethical considerations and best practices in the field; Project Management : Introduction to project management principles , Defining project objectives, scope, and stakeholders, project lifecycle stages,
Identifying and assessing risks, Gantt charts and critical path analysis, Monitoring and project progress,

Student Assessment Strategies
The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes
•4 practicals (40%),
•2 tests (40%) and
•2 assignments (20%).
The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6932IJ	DYNAMICS OF MARINE FOOD WEBS
Module Title:	Dynamics of Marine Food Webs
Module Code	F6932IJ
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1hr/week per semester. Practical: 1 x 2 hr. Alternate week per semester
Additional learning requirements	Participation in at least one fishery cruise, coastal fishery survey, or field visit is required
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose
The purpose of this module is to provide students with a detailed understanding of the structure and dynamics of marine food webs. It aims to offer a comprehensive overview of the organisms that constitute marine food webs, the relationships, and interactions between these organisms, and how these relationships influence the stability and function of marine ecosystems.

Module Content
Introduction to Marine Food Webs: Marine Ecosystem and food web structure, trophic levels, energy flow, and nutrient cycling; Components of Marine Food Webs: Primary producers -Phytoplankton and seagrass, Consumers: Zooplankton, fishes, birds, marine mammals, Decomposers and detritivores -Bacteria, fungi, and certain invertebrates; Interactions in Marine Food Webs: Plankton-Ichthyoplankton Coupling, Predator-prey relationships, Competitive and symbiotic interactions, Impact of these interactions on food web structure; Dynamics of Marine Food Webs: Influence of species diversity and trophic complexity on food web dynamics, Trophic cascades and their implications for marine ecosystems; Human and Environmental Impacts on Marine Food Webs: Effects of climate change, pollution, overfishing, and invasive species Case studies on impacted marine ecosystems; Modelling and Analysis of Marine Food Webs: Introduction to mathematical models and statistical tools to analyse food web dynamics

Student Assessment Strategies
The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes

- 3 practicals (40%),
- At least 2 tests (40%) and
- 2 Assignments (20%)

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6912IJ	OCEAN AND COASTAL POLLUTION MANAGEMENT
Module Title:	Ocean and Coastal Pollution Management
Module Code	F6912IJ
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1h / week per semester. Practical: 1 x 3h / week per semester
Additional learning requirements	Participation in at least one coastal pollution survey, port visit, or field visit is required.
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with a comprehensive understanding of various types of oceans- and coastal pollution, their sources, impacts, and management.

Module Content

Introduction to Marine Pollution: Types, sources, and Impacts of Marine Pollution; Transport and Fate of Pollutants in the Marine Environment: Physical, chemical, and biological processes; Effects of Pollution on Marine and Coastal Ecosystems: Impacts on Biodiversity, habitats, and ecosystem functioning; Detection and Monitoring of Marine Pollution: Principles and techniques for pollution monitoring and assessment; Marine Pollution Management Strategies: Prevention, control, and mitigation approaches. Marine Pollution Policies and Regulations: Overview of local, national, and international policies and regulations related to marine pollution. Future Challenges and Opportunities in Marine Pollution Management: Emerging pollution issues and new approaches for pollution management.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade, which includes:

- 4 assessed practicals (40%),
- 2 tests (40%)
- 1 field report (written assignment, 10%), and
- a seminar presentation (10%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6912IM MARINE BIOGEOCHEMISTRY AND OCEANOGRAPHY

Module Title:	Marine Biogeochemistry and Oceanography
Module Code	F6912IM
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1hr/week per semester. Practical: 1 x 3 hr. Alternate week per semester
Additional learning requirements	Participation in at least one oceanographic cruise, fishery cruise, or field visit is required
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to provide students with a profound understanding of the interactions between biological, geological, and chemical processes in marine environments, while also delving deep into oceanographic principles and their implications for marine biogeochemical cycles and the broader Earth system.

Module Content

Introduction to Marine Biogeochemistry: Basics of biogeochemical cycles in marine contexts ; Principles of Oceanography: Ocean layers, circulation patterns, and physical properties; Biogeochemical Cycles in the Ocean: Detailed study of carbon, nitrogen, sulphur, and phosphorus cycles; Impact of Anthropogenic Activities: Pollution, eutrophication, and shifts in biogeochemical balances; Ocean Dynamics: Upwelling, downwelling, and their biogeochemical significance; Marine Ecosystem Responses: Changes in marine food webs, habitats, and biodiversity; Tools and Techniques in Research: Oceanographic cruises, remote sensing, isotope studies, and molecular techniques; Climate Change Interactions: Ocean acidification, sea level rise, and implications for biogeochemical processes; Field Studies and Workshops: On-site explorations, sampling techniques, and data analysis.

Student Assessment Strategies

The student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 40% of the module grade which include:

- 2 assessed practicals (40%)
- 2 tests (40%),
- 2 written assignments (10%), and
- a seminar presentation (10%).

The summative assessment, which is the end-of-semester examination, will contribute 60% to the module grade (1x 3-hour theory paper). The pass mark for the module is 50%.

F6983II THESIS

Module Title:	Thesis
Module Code:	F6983II
NQF Level	9
Notional Hours	1200
Contact hours	On appointment with supervisor(s)
Additional learning requirements	Presenting the proposal in one seminar and the empirical findings in a second seminar is required
NQF Credits	120
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered Semester 1 &2

Module Purpose

The purpose of this module is is to guide students through the process of conducting original research in their chosen field within marine sciences

Module Content

Students carry out a supervised independent study of a current topic in marine sciences. The student will submit a final report written following guidelines for scientific writing, which should include the following:

i. Approved researchable title.
ii. Abstract
iii. Introduction /Background
iv. Literature review
v. Materials and Methods
vi. Results
vii. Discussion
viii. Conclusion and recommendations
ix. References
x. Appendices (if any)

Student Assessment Strategies

Continuous assessment (100%) consisting of research proposal write-up and presentation of the proposal in a seminar, presentation of empirical findings in a second seminar, and grading of the final report.

E.3.2.2 MASTER OF PHILOSOPHY IN FISHERIES AND OCEAN SCIENCE (31MPFO)

ADMISSION REQUIREMENTS

To be eligible for this Master of Philosophy (MPhil) in Fisheries and Ocean Science, the candidate must have completed a bachelor honours degree at NQF level 8 or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).

Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space.

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the Bachelors honours

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PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	9	16 (non-contributing)	4 hours per week	N/A	C
F6933IY	Thesis	9	240	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.
Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.
Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6933IY	THESIS
Module Title:	Thesis
Module Code	F6933IY
NQF Level	9
Notional Hours	2400
Contact hours	Face to face consultations with supervisor(s) on regular bases
Additional learning requirements	Seminar presentations
NQF Credits	240
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The purpose of this module is to equip students with advanced knowledge and research skills in fisheries and ocean sciences, focusing on sustainable practices, biodiversity conservation, and environmental stewardship.

Module Content
Students are required to conduct a supervised independent study on a current topic in fisheries and ocean sciences. The student must submit a thesis developed through the process outlined in the higher degree policy of the University of Namibia.

Student Assessment Strategies
The thesis will be examined by at least two experts/specialists who are PhD holders (external and internal) as per the Higher Degree Policy.

E.3.2.3 DOCTOR OF PHILOSOPHY IN FISHERIES AND OCEAN SCIENCE (31DPFO)

ADMISSION REQUIREMENTS

To be eligible for this Doctor of Philosophy (MPhil) in Fisheries and Ocean Science, the candidate must have completed a master's degree at NQF level 9 or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).

Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space.

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the MPhil or MSc

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	10	16 (non-contributing)	4 hours per week	N/A	C
F7073CA	Dissertation	10	360	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	10
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F7033IY	DISSERTATION
Module Title:	Dissertation
Module Code	F7033IY
NQF Level	10
Notional Hours	3600
Contact hours	As per the arrangements with the supervisor(s
Additional learning requirements	None
NQF Credits	360
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The purpose of this module is to develop students' expertise in fisheries and ocean sciences, emphasizing cutting-edge research methodologies and innovative approaches in sustainable practices, biodiversity conservation, and environmental stewardship. It aims to foster a deep understanding of complex marine systems, encouraging original research contributions that advance the field and inform global environmental policies and practices.

Module Content
Students are required to conduct a supervised independent study on a current topic in fisheries and ocean sciences. The student must submit a thesis developed through the process outlined in the University of Namibia's higher degree policy.

Student Assessment Strategies
The thesis will be examined by at least two experts/specialists who are PhD holders (external and internal) as per the Higher Degree Policy.

E.3.3.1 MASTER OF SCIENCE IN FOOD SAFETY AND QUALITY

ADMISSION REQUIREMENTS

To be eligible for an MSc. in Food Safety and Quality Management, the candidate must have completed a bachelor honours degree in Food Science or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).

Additional Selection Criteria

Based on the space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the Bachelors honours qualification.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Post-Graduate Students	9	16 Non-Contributing credits	4L / 3T	NONE	C
F6951SQ	Food Quality Management	9	24	4L/3P	NONE	C
F6951SR	Food Safety and Risk Management	9	24	4L/3P	NONE	C
F6961SL	Food Laws and Regulations	9	12	2L/2P	NONE	C
Total Credits Semester 1						60
Year 1 Semester 2						
F6952SM	Advanced Food Microbiology	9	24	4L/3P	NONE	C
F6952ST	Advanced Food Toxicology	9	24	4L/3P	NONE	C
F6962SE	Food Entrepreneurship and Management	9	12	2L/2P	NONE	C
Total Credits Semester 2						60
Total Credits Year 1						120
Year 2						
F6983SF	Thesis	9	120	As per the arrangements with the supervisor(s)	NONE	C
Total Credits Year 2						120
Total Credits for Programme						240

MODULE DESCRIPTORS
FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6951SQ	FOOD QUALITY MANAGEMENT
Module Title:	Food Quality Management
Module Code	F6951SQ
NQF Level	9
Notional Hours	240
Contact hours	4x 1hour lecture/ week; 1 x 3 hours practical alt for 1 semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

The purpose of the module is to equip students with knowledge on managing food quality. Students are taught on the importance of using methods, skills and controls in a consistent manner in food processing setups to ensure food quality. Students are also enlightened with knowledge and skills on food production in compliance with regulatory and global food quality management system and standards

Module Content
Concepts and definitions; Dynamics in the agri-food production chain; new trends of quality in food; quality management; quality control; quality assurance; food quality standards and dimensions; conformance and non-conformance; food traceability. Approaches to food quality management: technological approach; managerial approach; management planning tools; total quality management; methods of determining food quality (subjective and objective methods); food quality decision grids; principles of quality assurance and quality control; Quality control tools; use of biosensors in food quality control; statistical analysis tools in food quality control; quality assurance audits (ingredients and raw materials; product manufacturing, plant and employee sanitation, finished products); international quality assurance demands in the retail sector (GFSI, BRC, IFS). Food Quality Management Systems: ISO 9001; Deming cycle; ISO 22 000; Pre-requisite Programs (on farm and food manufactures); GlobalG.A.P, SOPs for food quality control; management systems audits.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., projects and seminars and case studies) and a summative assessment (end of semester examination) 50% (1x 3 hours' theory paper). Pass mark for the module is 50%.

F6951SR	FOOD SAFETY AND RISK MANAGEMENT
Module Title:	Food Safety and Risk Management
Module Code	F6951SR
NQF Level	9
Notional Hours	240
Contact hours	4x 1hour lecture/ week; 1 x 3 hour practical alt for 1 semester
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1
Module Purpose	

The module aims to cover aspects of food safety and legislation that protect the consumer. The module will provide knowledge to students on factors that can pose risks to consumers and the adverse effects to public health through consumption of unsafe food. The module aims to enhance students understanding on food safety, risk identification and management. Enhance students understanding of food safety strategies employed to manage food safety in the entirety of food chain.

Module Content
Concepts and definitions in food safety and management: Introduction to concepts of food safety; relation of food processing and food safety; industrial and consumers perspective on food safety; food safety ethics; food risks and hazards; food hygiene and monitoring; novel approaches for food safety evaluations; national and international food safety policies. Microorganisms in food: Microorganisms in food and food safety; bacterial growth in food including danger zones and hazardous food; routes of food contamination; food spoilage; pathogens and foodborne illnesses; biofilms, toxins and toxicity, dose-response relationships; Food safety management systems: pre-requisite requirements; HACCP systems; ISO 22000; Global Food safety Initiative (GFSI), Codex Alimentarius Commission (CAC); compliant with food safety legal requirements; Food Safety evaluations: define tools for setting up microbiological and toxicological risk evaluations; test and detection methods; food safety risk management; principles and elements of food safety risk management; Microbiological Risk Assessment (MRA), risk management metrics: Appropriate Level of Protection (ALOP); Public Health Goals (PHG); Food Safety Objectives; data analytic techniques in food safety and risk assessment.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., seminars and projects, tests, and 2 assignments) and final case study presentation) and a summative assessment (end of semester examination) 50% (1x 2 hours' theory paper). Pass mark for the module is 50%.

F6961SL	FOOD LAWS AND REGULATIONS
Module Title:	Food Laws and Regulations
Module Code	F6961SL
NQF Level	9
Notional Hours	120
Contact hours	2x 1hour lecture/ week; 1 x 2 hour practical alt for 1 semester
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1
Module Purpose	

The purpose of the module is to equip students with broader knowledge on modern food laws and regulations applicable to food safety, food trade and consumer protection. Students are taught on how to find, understand, interpret and navigate food laws from a practical perspective. The module aims to capacitate students with an ability of keeping up to date with all regulatory developments, mitigate legal exposure, and ensure compliance in the area of food laws and regulations.

Module Content
Concepts and definitions: overview on history of food laws; food acts and regulations; food standards; food additives; adulterations; public health; food defense and food fraud. Food safety policy: Formulation, implementation and monitoring of national food safety polices. Food laws: Fundamentals of food laws; components of food laws (scope and definitions, general principles, offences, defenses, administrative provisions, enforcements); national and regional food laws. Food regulations: Food regulatory developments: driving forces for food regulation; emerging food regulation issues; understanding and application of regulations such as food standards; food hygiene; food additives; pesticides; veterinary drug residues; contaminants; food packaging and labeling; food traceability; organic products, GMOs, novel foods. International food control systems: Codex Alimentarius Commission (CAC), FAO/WHO- Food and Agriculture Organisation/World Health Organisation; World Trade Organisation-The International Plant Protection Convention (IPPC); World Organization for Animal Health (OIE); OECD-Agriculture and Fisheries. Food defense and fraud: food fraud prevention strategy; principles of food defense; food defence analysis; food defence plans.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., seminars and projects, tests, assignments, and case study presentation; and a summative assessment (end of semester examination) 50% (1x 2 hours' theory paper). Pass mark for the module is 50%.

F6952SM	ADVANCED FOOD MICROBIOLOGY
Module Title:	Advanced Food Microbiology
Module Code	F6952SM
NQF Level	9
Notional Hours	240
Contact hours	4 x 1 Lecture hours/ week; 1 x 3 hour practical/alt week
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	Food Safety and Risk Management
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
The purpose of the module is to provide students with advanced knowledge of research and critical thinking relating to microorganisms of food significance that affect quality (safety, shelf-life and consistency) their physical properties, pathogenic mechanisms and the metabolic pathways utilized spoilage, pathogenic and beneficial microorganisms. The mechanisms of food quality deterioration through microbial biochemical activities, survival and adaptation strategies and how the growth and traits are sustainably used as approaches in food quality preservation. The module will also emphasize prevention rather than cure through the HACCP approach. The module will consolidate the analytical skills on detection, quantification and identification of microorganisms captured in previous years.

Module Content
Characteristics of Predominant Microorganisms in foods. Normal Microbiological quality of Foods and its significance. Microbial growth and stress response in the food and non-food environments (biofilm formation, antimicrobial resistance, viable but nonculturable (VBNC) state, and heat shock responses). Factors influencing Microbial growth in Food. Microbial Metabolism of food components. Viral and bacterial food borne diseases: Food born infections and intoxications; food virology; concepts in virology; characteristics of foodborne viruses; prevention and control of foodborne viruses; detection, experimental methods and technologies used in food virology; bacterial food borne illness: Properties and characteristics of foodborne bacterial pathogens and their diseases; habitats, transmission, pathogenicity and toxin production; conventional and rapid detection methods; control of bacterial food pathogens, Fungal contaminants in food. Food bioprocessing and bio preservation: prebiotics, probiotics and bacteriocins; recent developments and biotechnological trends in food industry, genera/species of importance in dairy, cereal, beverage, meat, additives and emulsifiers, enzymes, mycotoxin detoxifications and food industrial wastes.

Student Assessment Strategies
Student assessment for this module will consist of formative and summative tasks. Formative assessments will make up 50% of the module grade (i.e., at least 6 assessed practical sessions , 2 tests and 2 assignments, assessed) and final case study presentation) and a summative assessment (end of semester examination) 50% (1x 3 hours' theory paper). Pass mark for the module is 50%.

F6952ST	ADVANCED FOOD TOXICOLOGY
Module Title:	Advanced Food Toxicology
Module Code	F6952ST
NQF Level	9
Notional Hours	240
Contact hours	Lectures: 4 x 1 hr/wk; and 3 x 1hour practical alt/wk for one semester
Additional learning requiremen	Group work
NQF Credits	24

(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to increase the student's understanding, skills, and attitude to prevent, detect, and analyse injurious food chemical components and/or food chemical contaminants to ensure and improve food safety. The application of toxicology principles in the determination of food chemical toxicants and step-by-step approach to food chemical hazard risk analysis, assessment, mitigation, and management are also covered.

Module Content

Food chemical toxicants/allergens: Natural plant origin toxin components, Natural seafood origin toxin components, Natural mushroom origin toxin components and mycotoxins, Bacterial and virus toxicants, Food additives, Contaminants from processing machinery e.g., metal ions from hammer mills, Contaminants from environment e.g., heavy metals, pesticides, insecticides, herbicides, veterinary drug residues, medical drug residues, Contaminants from packaging materials, Generated toxins during preparation, processing and preservation e.g. carcinogens and mutagens, food components allergens. Biotechnology-derived food: Genetically modified organisms safety risk assessments. Prions case studies of brain as food. Toxicodynamics: toxicity measurements; turnover of contaminants; effect of contaminants; acceptable daily intakes; tolerable daily intakes; new approach methodologies. Food protection and defence: Key relevant food safety practices, standards, legislations and regulations; Chemical hazards critical control food processing steps; Emergency preparedness and management; Critical incident reporting protocol; Post food safety incident protection and recovery; Food fraud, audit and adulteration; Emerging chemical food contaminants: Tracing of chemical toxicant source e.g., environment (soil, water, air) and/or intentionally man-made. Food hygiene and safety measures: Quality assurance inspections, control measures, verification and documentation. Food safety risk: Factors e.g., inherent, mitigatory, compliance; intelligent identification of risk factors for prevailing conditions e.g., household, open markets, SMEs; commodity-specific risk identification, assessment, modelling, mitigation and management. Public health and awareness creation: Informed and clear communication strategy tailored for various audiences e.g., brochures, pamphlets, videos, audio recordings, radio discussions, roleplays and dramas; presentations at community meetings or scientific conferences, policy briefs for policy makers.

Student Assessment Strategies

This module will be evaluated using formative assessment only. This will comprise a group project involving teamwork to minimise and manage food safety risks (40%), 2 tests (30%), 2 assignments (20%) and 1 seminar (10%). The pass mark for the module is 50%.

F6962SE FOOD ENTREPRENEURSHIP AND MANAGEMENT

Module Title:	Food Entrepreneurship and Management
Module Code	F6962SE
NQF Level	9
Notional Hours	120
Contact hours	Lectures: 2 x 1 hr/wk; and 2 x 1 hour practical alt/wk for one semester
Additional learning requiremen	Group work
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

The purpose of this module is to increase the students understanding of food enterprise development and management, local and international food markets and key aspects employed in the analysis and evaluation of the food supply chain. The application of innovation to new food products, services and food processing ventures is also covered.

Module Content

Food supply chains: Global food markets and systems, current food trends and innovations in food products, barriers and drivers of sustainable food supply chains; food supply chain management and performance. Food Innovations: Design thinking for opportunity creation; types of innovation; Innovation strategies and R&D for food industry; building entrepreneurial strategy. Application of innovation models: e.g. Innovation Diamond, Lean Start-up. Food innovations case studies e.g. traditional foods, functional foods, bio-based packaging, IoT; emerging technologies. Food marketing: consumer behavior, food market and consumer research, strategic marketing planning. Operations and Production considerations: operations strategy development, production planning and processing plant economics; Green hydrogen as an energy vector and input in food industry innovations; organisational management; New food venture viability: technical; market; financial, commercial; social; environmental; business model design; financing new ventures. Business expansion: business strategies; strategy development.

Student Assessment Strategies

This module will be evaluated using formative assessment only. This will comprise a group project involving team work to create prospective new ventures (40%), 2 tests (30%), 2 assignments (20%) and 1 seminar (10%). The pass mark for the module is 50%.

F6983SF THESIS

Module Title:	Thesis
Module Code	F6983SF
NQF Level	9
Notional Hours	1200

Contact hours	On appointment with supervisor(s)
Additional learning requiremen	None
NQF Credits	120
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The purpose of this module is to provide graduates with advanced general acceptable scientific knowledge, skills and attitudes necessary for basic or applied research in Food Safety and Quality Management. It equips the graduate with creativity and intellectual discernment of key solutions and approaches that are necessary for economic growth, sustainable food industry development and safety of food and beverages.

Module Content

As per the Higher Degrees Policy, Procedures and Regulations of the University, the student, with guidance from the supervisor(s) will execute the identified problem in the area of food safety and quality using the scientific method based on the proposal approved by the relevant board/committee of the University as stipulated in the Higher Degrees Policy, Procedures and Regulations. The research topic can be identified in conjunction with funding and food and beverage companies, government and other organisations. This allows for novel and emerging challenges to be tackled or for latest novel processes to be explored. A student must submit a research proposal in the second semester of the first academic year. A student can only officially register for the second year after acceptance of his/her research proposal by the Postgraduate Studies Committee.

Student Assessment Strategies

As per the Higher Degrees Policy, Procedures and Regulations, a Master's thesis shall be submitted to at least two examiners recommended by the School Higher Degrees Board and approved by the Higher Degrees Committee for examination. At least one of the examiners in each case must be external to the University of Namibia, except when the student is a staff member in which case all examiners must be external. The supervisor(s) should not be one of the examiners. Following the Higher Degrees Policy, Procedures and Regulations, the student shall also undergo a *viva voce* examination provided the thesis has received at least a PASS. Supervisors are not part of the *viva voce* examination panel. The student must pass both the thesis and the public *viva voce* examinations for the Higher Degree Committee to approve the results.

E.3.3.2 MASTER OF PHILOSOPHY IN FOOD SCIENCE AND TECHNOLOGY (31MPFT)

ADMISSION REQUIREMENTS

To be eligible for an MPhil in Food Science and Technology, the candidate must have completed a bachelor honours degree in Food Science or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).

Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space. As such, Departments shall not recommend students for higher degrees' admission if they do not have the capacity to supervise. The University encourages co-supervision with academic staff members from within the University or other universities as well as industry where specialised knowledge is required, but the main supervisor should be based at UNAM.

Additional Selection Criteria

Based on the space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the Bachelors honours qualification.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	9	16 (non-contributing)	4 hours per week	N/A	C
F6953ST	Thesis	9	240	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6953ST	THESIS
Module Title:	Thesis
Module Code	F6953ST
NQF Level	9
Notional Hours	2400
Contact hours	As per the arrangement with supervisor(s)
Additional learning requirements	Seminar presentations
NQF Credits	240
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The purpose of this module is to provide graduates with advanced general acceptable scientific knowledge, skills and attitudes necessary for basic or applied research in Food Science and Technology. It equips the graduate with creativity and intellectual discernment of key solutions and approaches that are necessary for economic growth, sustainable food industry development and safety of food and beverages.

Module Content
As per the Higher Degrees Policy, Procedures and Regulations of the University, the student, with guidance from the supervisor(s) will execute the identified problem in the Food Science and Technology field using the scientific method based on the proposal approved by the relevant board/committee of the University as stipulated in the Higher Degrees Policy, Procedures and Regulations. The research topic can be identified in conjunction with funding and food and beverage companies, government and other organisations. This allows for novel and emerging challenges to be tackled or for latest novel processes to be explored.

Student Assessment Strategies
Assessment will be done based on examination of the thesis as per the University's Higher Degrees Policy, Rules, and Regulations. Candidates are expected to secure a minimum of 50% marks in their thesis work.
In addition to the thesis, candidates must appear for a Viva Voce (oral examination) conducted by a panel of examiners. Passing the Viva Voce is a mandatory requirement for the successful completion of the MPhil programme.
Masters by Research students are further required to have at least one (1) peer reviewed article accepted for publication or published in internationally indexed and accredited outlets with the student as main author and supervisor(s) as co-author (s), before graduation

E.3.3.3 DOCTOR OF PHILOSOPHY IN FOOD SCIENCE (31DPFS)

ADMISSION REQUIREMENTS

To be eligible for the PhD in Food Science, the candidate must have completed master's degree in Food Science or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%. Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
Along with the application, candidates need to submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility and availability of a supervisor. As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note and identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space. As such, Departments shall not recommend students for higher degrees' admission if they do not have the capacity to supervise. The University encourages co-supervision with academic staff members from within the University or other universities as well as industry where specialised knowledge is required, but the main supervisor should be based at UNAM.

Additional Selection Criteria

Based on the space availability, the final selection for qualifying candidates may be based on additional criteria such as equity considerations or high score/percentage obtained in the MPhil or Master's qualification.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	10	16 (non-contributing)	4 hours per week	N/A	C
F7053SD	Dissertation	10	360	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	10
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content
The module will cover the following:
Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.
Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.
Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F7053SD	DISSERTATION
Module Title:	Dissertation
Module Code	F7053SD
NQF Level	10
Notional Hours	3600
Contact hours	As per the arrangements with the supervisor(s
Additional learning requirements	None
NQF Credits	360
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
The purpose of this module is to provide graduates with specialised theoretical and applied scientific knowledge, skills and attitudes necessary for execution of basic, applied and translational research in Food Science and Technology. It equips the graduates with creativity, high intellectual prowess and effective leadership attributes that are necessary for efficient knowledge generation, economic growth, sustainable food industry development and safety of food and beverages.

Module Content
As per the Higher Degrees Policy, Procedures and Regulations of the University, the student, with advice from the supervisor(s) will almost independently execute the identified problem in the Food Science and Technology field using the scientific method based on the proposal approved by the relevant board/committee of the University as stipulated in the Higher Degrees Policy, Procedures and Regulations. The research topic must be original/novel and can be identified in conjunction with funding and food and beverage companies, government and other organisations. This allows for novel and emerging challenges to be tackled or for latest novel processes to be explored.

Student Assessment Strategies
Assessment will be done based on examination of the dissertation as per the University's Higher Degrees Policy, Rules, and Regulations. Candidates are expected to secure a minimum of 50% marks in their dissertation work.
In addition to the dissertation, candidates must appear for a Viva Voce (oral examination) conducted by a panel of examiners. Passing the Viva Voce is a mandatory requirement for the successful completion of the PhD programme. PhD by Dissertation students whose enrolment is based largely on a supervised research project are required to have a minimum of two (2) peer reviewed articles in internationally indexed, accredited journal; accepted for publication or published, with the student as main author and supervisor/s as co-author (s) before graduation.

E.3.4.1 MASTER OF SCIENCE IN AGRONOMY (LEVEL 9) (31MSAC)

ADMISSION REQUIREMENTS

Entrance into the Master of Science in Agronomy program requires a Bachelor of Science Honours in either Crop Production, (NQA 8) from UNAM or equivalent qualification from a recognised institution of Higher Education, with an average of at least 60%.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Postgraduate Students	9	16 non-contributing	L (4hr/wk)	None	C
F6911CA	Advanced Biometry in Crop Production	9	24	L (4hr/wk) P (3hr/wk)	None	C
F6931CN	Soil Management and Plant Nutrition	9	24	L (4hr/wk) P (3hr/wk)	None	C
F6901CM	Advanced Integrated Pest Management	9	12	L (3hr/wk) P (3hr/wk)	None	C
Total Credits Semester 1						60
Year 1 Semester 2						
F6952CD	Advanced Field and Forage Crop Production	9	24	L (4hr/wk) P (3hr/alt.wk)	None	C
F6952TB	Postharvest and Product Quality Management	9	24	L (4hr/wk) P (3hr/wk)	None	C
F6922CE	Remote Sensing and GIS in Environmental Agronomy	9	12	L (3hr/wk) P (3hr/wk)	None	C
Total Credits Semester 2.				60		
Total credits YEAR 1				120		
Year 2 Semester 1						
F6983CG	Thesis	9	60	On appointment	None	C

				with supervisor (s).		
Total credits YEAR2: Semester 1				60		
Year 2 Semester 2						
F6983CG	Thesis	9	60	On appointment with supervisor (s).	None	C
Total credits YEAR2: Semester 2				60		
Total credits Year 2				120		
TOTAL CREDITS FOR THE PROGRAMME				240		

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6911CA	ADVANCED BIOMETRY IN CROP PRODUCTION
Module Title:	Advanced Biometry in Crop Production
Module Code	F6911CA
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
To expose students to the application of biometric and statistical methods for optimizing crop production systems.

Module Content
Introduction to advanced biometry in crop production; role of biometry in crop research and precision agriculture; importance of experimental design; and statistical analysis. Advanced statistical methods for crop data analysis: linear and nonlinear regression analysis, analysis of variance (ANOVA) with mixed effects, and multivariate statistical techniques. Experimental design in crop studies: randomized complete block designs (RCBD) and Latin squares, split-plot and factorial designs, BIBDS, and response surface methodologies. Mathematical modelling of crop growth and yield; differential equation models for crop growth, crop yield prediction models, simulation of growth-environment interactions. Optimization of crop production practices; resource allocation and optimization techniques; precision agriculture and variable rate technologies; decision support systems for crop management. Remote sensing and GIS applications in crop production; satellite imagery analysis for crop monitoring; spatial variability assessment and management zone delineation; precision agriculture mapping and prescription techniques. Case studies and practical exercises; real-world examples of biometry applications in crop production. Hands-on data analysis and modelling projects.

Student Assessment Strategies
Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals): 40%; and Examination: 60% (1 x 3-hour paper).
A subminimum of 40% in the examination is required to pass, irrespective of the final mark
A student must obtain a minimum final mark of 50% to pass this module.

F6931CN	SOIL MANAGEMENT AND PLANT NUTRITION
Module Title:	Soil Management and Plant Nutrition
Module Code	F6931CN
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field excursions
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose
To provide a thorough understanding of the movement of water and nutrients in both soil and plants, aspects of the impact of nutrient processes on soil stability, carbon sequestration, and greenhouse gas emissions and soil management.

Module Content

Concepts of soil management and plant nutrition; Food production and soils of world; Goals of soil and plant nutrition studies, technology and techniques for interpreting soil test results, managing water resources efficiently, and analyzing plant tissue data; Growth and phases of growth; Genetic and environmental factors affecting plant growth; Growth expressions and equations; Role of soil colloids in nutrient supply, exchange phenomenon and availability of ions; Movement of ions in soil (root interception, mass flow and diffusion of ions); Essentiality of nutrients and levels of nutrients in soil system in relation to plant; Plant nutrient functions, deficiency and toxicity symptoms; nutrient (macro and micro) transformations in soil and their bioavailability; Nutrient management Soil analysis methods, sampling, and observations (industrial fertilizers, bio-fertilizer and organic fertilizers) and their management; Nutrients use efficiency and parameters; fertilizers formulation and the environment; Diagnosis of nutrient status: Use of soil and plant tests, their interpretation to evaluate nutrient status of soil; Calibration of soil tests against crop response; Soil and plant analysis: determining nutritional problems, evaluating fertilizer programs, nutrient interactions, limitations of plant analysis, Diagnosis of fertilizer requirement and recommendation; fertilizer management economics. Green hydrogen and Ammonia production technologies and Agri Voltaics (Agri-PV) production systems. Bio Circular-Green Economy. Field Excursion: Before classes end, students will undertake a one-week field trip to Ministry of Agriculture and Ministry of Mines and Energy Soil Laboratories, Windhoek for exposure to various soil analyses and classifications.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals, 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

F6901CM	ADVANCED INTEGRATED PEST MANAGEMENT
Module Title:	Advanced Integrated Pest Management
Module Code	F6901CM
NQF Level	9
Notional Hours	120
Contact hours	3 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Compulsory field trips / excursions (outside the normal practicals)
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

To provide an advanced understanding of integrated crop pest and disease management strategies

Module Content

Pest management history and the ecological basis of insect pest management, cultural control. Economic considerations in insect pest management, Estimation of crop yield losses economic Losses, EIL and ET. System analysis and insect pest management, Modelling and curves of insect growth and Development, Relationship between temperature and insect growth and development, Simulation models of insect development rates. Advances in biological control, evaluating indirect ecological effects of biological control, measuring success in biological control, Future of biological control. Advances in host plant resistance, Novel approaches to HPR (e.g., elicitors, induced resistance, and dissection of signalling pathways in plants, "indirect defence"). Insect sampling, Common distributions of insect populations in the field (Random, uniform, and aggregated distributions), Sampling techniques (In situ, knockdown, netting, trapping, extraction; absolute and relative; direct vs indirect), Sampling program (Sampling size determination). Novel chemistries in insect pest Management, Insecticide resistance management, Challenges, and prospects. Area-wide pest management, Sterile insect technique. Genetic Engineering for insect management, Bt resistance, Bt resistance monitoring, a Resistance management strategy for Bt crop, other resistance management strategies, Impact of Bt plants on non-target organisms. Applications of global positioning systems (GPS) and geographical information systems (GIS) in pest management. Field Excursion: Before classes end, students will undertake a one-week field trip to Entomology Laboratory (Windhoek) and commercial farms in Okahandja, Otjiwarongo, Otavi, Grootfontein and Tsumeb, Namibia to appreciate various pest control strategies used by farmers.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals, 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

SEMESTER TWO

F6952CD	ADVANCED FIELD AND FORAGE CROP PRODUCTION
Module Title:	Advanced Field and Forage Crop Production
Module Code	F6952CD
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Compulsory field trips / excursions (outside the normal practicals)
NQF Credits	24
(Co-requisites)	

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

To equip students with advanced knowledge and skills in the cultivation, management, and utilization of field and forage crops.

Module Content

Variety selection of Field and Forage Crops: Suitability of varieties for food, feed and entrepreneurship development; Genetics, genomics and breeding of field and forage crops. Growth and development of field and forage crops: Physiological principles of crop growth and development for adaptation to production environment and management; Development of plant structures (leaf, root, stem and reproductive system); Morphological descriptors of growth stages for field crops and forage grasses and legumes. Field and Forage crops Yield and Nutritional Quality: Improving the yield and nutritional quality of field and forage crops. New Technologies in field and forage crops production for Irrigated and Dry Lands: Climate Resilience and adaptation to production environment; New approach is the cultivation of organic food and feed with a balanced nutritional composition, Environmental (soil, water and biodiversity) protection and sustainability; Hydroponic fodder production. Field and Forage Crop Management Strategies: Agronomic and forage crops cropping systems; Integrated Forage/Row crop system; Soil and Nutrient Management Program; Integrated Pest and Disease Management; Use of Artificial Intelligence (AI) for making crop management predictions and decisions. Post-Harvest Technologies: Transportation, Handling and Storage of field and forage crops; Silage and Hay Making Technologies; Value addition of field crops and forage densification for entrepreneurship. Economic analysis of fodder production, conservation and enrichment technologies. Field Excursion: Before classes end, students will undertake a one-week field trip to commercial farms in Tsumeb, Otavi, and Grootfontein to appreciate various production techniques.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals, 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module

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F6952TB POSTHARVEST AND PRODUCT QUALITY MANAGEMENT

Module Title:	Postharvest and Product Quality Management
Module Code	F6952TB
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field trips / excursions
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

To provide knowledge and innovative skills on post-harvest losses and product quality management throughout the value chain

Module Content

Postharvest Plant Biology; Nature and structure of harvested product; metabolic processes, respiration, and water losses of harvested products; ethylene and other plant hormones; quality and maturity; pre- and postharvest factors affecting fruit and vegetable quality.

Postharvest Technology: Postharvest losses of perishable crops; quality safety and standards; maturity indices; harvesting technology; cooling; postharvest treatment; storage and controlled atmosphere; packaging technology; chain management; transport and distribution.

Quality and Food Safety Management: Basis for food regulations; national and international food regulations; quality and grade standard; statistical process control; quality assurance; total quality management; quality system in Agro-Industry.

Postharvest Diseases: Significance; postharvest losses due to biotic and abiotic stresses; postharvest disease development; physiological and biochemical changes following infection; attack mechanisms of the pathogen; defense mechanisms in plants against the pathogen; control of postharvest diseases.

Packaging: Packaging types and systems for transport and distribution; Active, bright and intelligent packaging; innovation of packing and packaging materials; sustainable packaging. Packaging for Transport and Distribution: packaging technology for transport and distribution, shock; vibration; compression; cushion; palletization; packaging pre-shipment testing, Agricultural Logistics Management:

Postharvest Technology of Ornamental Crops: Postharvest physiology and biochemistry; postharvest management of cut flowers and cut foliages; post-production management of potted ornamentals; treatments for improving quality and the longevity of cut flowers; packing house operation and packaging systems; commercial ornamental productions; current issues and applications.

Postharvest Pest Management: Importance of postharvest pests; crop loss assessment; outbreak forecasting and management, cultural, physical, biological and chemical approaches for postharvest pest management; postharvest integrated pest management. Field Excursion: Before classes end, students will undertake a three-day field trip to visit grain silos in northern regions to understand grain management.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, 7 practicals, 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

F6922CE	REMOTE SENSING AND GIS IN ENVIRONMENTAL AGRONOMY
Module Title:	Remote Sensing and GIS in Environmental Agronomy
Module Code	F6922CE
NQF Level	9
Notional Hours	120
Contact hours	3 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field work, computer lab activities and mini project
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

Provide detailed understanding of the rapid development of Geographical Information and Remote Sensing technology and their applications in agro-ecological systems.

Module Content

Fundamentals of Geographic Information Systems (GIS), Remote Sensing and Aerial Photography, Database Management Systems, GPS and its Applications, Fundamentals of Remote Sensing, GIS Technologies, Mapping Technologies, Digital Photogrammetry, Spatial analysis and Modelling, Applications and Development of GIS and Remote Sensing in Agronomic Crop Production and Land Management, Digital Image Processing in Remote Sensing for Crop Assessment. Field Excursion: Before classes end, students will undertake a one-day field trip to nearby crop farms for GIS application

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, 4 practicals, 1 field report): 40%; and Examination: 60% (1 x 2-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

SECOND YEAR

F6983CG	THESIS
Module Title:	Thesis
Module Code	F6983CG
NQF Level	9
Notional Hours	1200
Contact hours	On appointment with supervisor (s).
Additional learning requirements	None
NQF Credits	120
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

To implement a research proposal for thesis development and submission of a thesis for graduation in the Master of Science in Agronomy.

Module Content

This module entails developing and presenting a research proposal and its approval, conducting the research project, writing the thesis and presenting the research results. The student will submit a final report/thesis written following guideline for scientific writing, which should include but not be limited to the following:

1. Approved researchable topic
2. Abstract
3. Introduction /Background
4. Literature review
5. Methodology or Research Design
6. Results and findings
7. Conclusion and recommendation
8. References based on APA (UNAM adopted format).
9. Appendices (if any)

Student Assessment Strategies

Continuous assessment (100%) consisting of research proposal write-up and presentation of proposal in a seminar, presentation of empirical findings in a second seminar, and grading of the final report/thesis.

E.3.4.2 MASTER OF SCIENCE IN HORTICULTURE (31MSHC)

ADMISSION REQUIREMENTS

To be eligible for this MSc programme, the candidate must have completed:

- A Bachelor Honours Degree in Horticulture (NQF level 8) or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%.
- Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
- A concept note reflecting research interest should accompany the application form.
- Selection of students will be based on academic performance, the concept note, available supervisory capacity.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Prerequisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Post-graduate Students	9	16 non-contributing credits	L(4hr/wk)	None	C
F6911CA	Advanced Biometry in Crop Production	9	24	L (4hr/wk), P (3hr/wk)	None	C
F6931TA	Advanced Olericulture and Pomology	9	24	L (4hr/wk), P (3hr/alt wk)	None	C
F6901CC	Advanced Integrated Pest Management	9	12	L (2hr/wk), P (3hr/alt.wk)	None	C
Total Credits Semester 1		**60**				
Year 1 Semester 2						
F6952TB	Postharvest and Product Quality Management	9	24	L (4hr/wk), P (3hr/wk)	None	C
F6972TC	Water Relations and Mineral Nutrition	9	24	L (4hr/wk), P (3hr/wk)	None	C
F6922TD	Advanced Ornamental Horticulture and Landscaping	9	12	L (2hr/wk), P (3hr/wk)	None	C
Total Credits Semester 2		**60**				
Total credits YEAR 1		**120**				
Year 2 Semester 1 & 2						
F6993CG	Thesis	9	60	On appointment with supervisor (s).	None	C
Total Credits Semester 1 & 2		**60**				
Total credits YEAR 2		**120**				
TOTAL CREDITS FOR THE PROGRAMME: 240						

MODULE DESCRIPTORS

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6911CA	ADVANCED BIOMETRY IN CROP PRODUCTION
Module Title:	Advanced Biometry in Crop Production
Module Code	F6911CA
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None

NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

To expose students to the application of biometric and statistical methods for optimizing crop production systems.

Module Content

Introduction to advanced biometry in crop production; role of biometry in crop research and precision agriculture; importance of experimental design; and statistical analysis. Advanced statistical methods for crop data analysis: linear and nonlinear regression analysis, analysis of variance (ANOVA) with mixed effects, and multivariate statistical techniques. Experimental design in crop studies: randomized complete block designs (RCBD) and Latin squares, split-plot and factorial designs, BIBDS, and response surface methodologies. Mathematical modelling of crop growth and yield; differential equation models for crop growth, crop yield prediction models, simulation of growth-environment interactions. Optimization of crop production practices; resource allocation and optimization techniques; precision agriculture and variable rate technologies; decision support systems for crop management. Remote sensing and GIS applications in crop production; satellite imagery analysis for crop monitoring; spatial variability assessment and management zone delineation; precision agriculture mapping and prescription techniques. Case studies and practical exercises; real-world examples of biometry applications in crop production. Hands-on data analysis and modelling projects.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

F6931TA ADVANCED OLERICULTURE AND POMOLOGY

Module Title:	Advanced Olericulture and Pomology
Module Code	F6931TA
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field excursions
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

To equip students with advanced vegetable (olericulture) and fruit (pomology) production skills.

Module Content

Planning for vegetable and fruit enterprises: site selection, socio-economic consideration, production and cultural practices and protected cultivation. Crop Improvement: advanced plant breeding techniques; genetic modification; biotechnology; yield and quality improvement; vegetable and fruit resilience; disease resistance. Crop Management: precision agriculture; integrated pest management; sustainable irrigation techniques; resource utilisation; environmental impact. Market Trends and Consumer Preferences: market trends analysis; consumers preferences for vegetables and fruits; crop selection; production strategies; and marketing approaches. Environmental sustainability: sustainable agricultural practices; biodiversity promotion; natural resources conservation. Global Agricultural Systems: international agricultural systems and policies; the global context of olericulture and pomology; climate change; trade; food security. Ethics and Social Responsibility: ethical considerations; impact of genetically modified organisms; pesticide use; and land management. Innovation and Adaptation: emerging technologies, techniques, and challenges. Field Excursion: Before classes end, students will undertake a one-week field trip to the maize triangle (Tsumeb, Grootfontein and Otavi) and crop production related industries in Windhoek.

Student Assessment Strategies

Continuous Assessment: 50% (minimum of 2 tests, 1 assignment, at least 5 Practicals). Examination: 50% (1 x 03 hours paper).

F6901CC ADVANCED INTEGRATED PEST MANAGEMENT

Module Title:	Advanced Integrated Pest Management
Module Code	F6901CC
NQF Level	9
Notional Hours	120
Contact hours	3 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Compulsory field trips / excursions (outside the normal practicals)
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered Semester 1
Module Purpose
To provide an advanced understanding of integrated crop pest and disease management strategies

Module Content
Pest management history and the ecological basis of insect pest management, cultural control. Economic considerations in insect pest management, Estimation of crop yield losses economic Losses, EIL and ET. System analysis and insect pest management, Modelling and curves of insect growth and Development, Relationship between temperature and insect growth and development, Simulation models of insect development rates. Advances in biological control, evaluating indirect ecological effects of biological control, measuring success in biological control, Future of biological control. Advances in host plant resistance, Novel approaches to HPR (e.g., elicitors, induced resistance, and dissection of signalling pathways in plants, "indirect defence"). Insect sampling, Common distributions of insect populations in the field (Random, uniform, and aggregated distributions), Sampling techniques (In situ, knockdown, netting, trapping, extraction; absolute and relative; direct vs indirect), Sampling program (Sampling size determination). Novel chemistries in insect pest Management, Insecticide resistance management, Challenges, and prospects. Area-wide pest management, Sterile insect technique. Genetic Engineering for insect management, Bt resistance, Bt resistance monitoring, a Resistance management strategy for Bt crop, other resistance management strategies, Impact of Bt plants on non-target organisms. Applications of global positioning systems (GPS) and geographical information systems (GIS) in pest management. Field Excursion: Before classes end, students will undertake a one-week field trip to Entomology Laboratory (Windhoek) and commercial farms in Okahandja, Otjiwarongo, Otavi, Grootfontein and Tsumeb, Namibia to appreciate various pest control strategies used by farmers.

Student Assessment Strategies
Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals, 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).
A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

SEMESTER TWO

F6952TB	POSTHARVEST AND PRODUCT QUALITY MANAGEMENT
Module Title:	Postharvest and Product Quality Management
Module Code	F6952TB
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field trips / excursions
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose
To provide knowledge and innovative skills on post-harvest losses and product quality management throughout the value chain

Module Content
Postharvest Plant Biology; Nature and structure of harvested product; metabolic processes, respiration, and water losses of harvested products; ethylene and other plant hormones; quality and maturity; pre- and postharvest factors affecting fruit and vegetable quality.
Postharvest Technology: Postharvest losses of perishable crops; quality safety and standards; maturity indices; harvesting technology; cooling; postharvest treatment; storage and controlled atmosphere; packaging technology; chain management; transport and distribution.
Quality and Food Safety Management: Basis for food regulations; national and international food regulations; quality and grade standard; statistical process control; quality assurance; total quality management; quality system in Agro-Industry.
Postharvest Diseases: Significance; postharvest losses due to biotic and abiotic stresses; postharvest disease development; physiological and biochemical changes following infection; attack mechanisms of the pathogen; defense mechanisms in plants against the pathogen; control of postharvest diseases.
Packaging: Packaging types and systems for transport and distribution; Active, bright and intelligent packaging; innovation of packing and packaging materials; sustainable packaging. Packaging for Transport and Distribution: packaging technology for transport and distribution, shock; vibration; compression; cushion; palletization; packaging pre-shipment testing, Agricultural Logistics Management:
Postharvest Technology of Ornamental Crops: Postharvest physiology and biochemistry; postharvest management of cut flowers and cut foliages; post-production management of potted ornamentals; treatments for improving quality and the longevity of cut flowers; packing house operation and packaging systems; commercial ornamental productions; current issues and applications.
Postharvest Pest Management: Importance of postharvest pests; crop loss assessment; outbreak forecasting and management, cultural, physical, biological and chemical approaches for postharvest pest management; postharvest integrated pest management. Field Excursion: Before classes end, students will undertake a three-day field trip to visit grain silos in northern regions to understand grain management.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, 7 practicals, 1 field report): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

F6972TC	WATER RELATIONS AND MINERAL NUTRITION
Module Title:	Water Relations and Mineral Nutrition
Module Code	F6972TC
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field excursions
NQF Credits	24
(Co-requisites)	
Prerequisite	Soil Fertility and Plant Nutrition
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

To provide knowledge and innovative skills in water relations and mineral nutrition

Module Content

Soil fertility and plant nutrition for crop productivity, soil water, and plant growth. Nutrient movement, uptake, and assimilation: movement of ions to roots, root interception, mass flow, diffusion, ion uptake mechanism, passive ion uptake, active ion uptake. Plant water relationship: soil water relationship, fundamental processes in plant water relations, physiological aspects of water. Nutrition and plant growth: factors affecting plant growth, environmental factors, genetic factors, growth expressions and equations, nutrient utilisation and metabolism, nutrition and yield responses, nutrition, and plant quality. Major nutrient cycle: Carbon cycle, nitrogen cycle, sulfur cycle, phosphorus cycle and potassium cycle. Nutrient availability. Soil fertility evaluation and fertiliser application: Analysis and diagnosis of fertility status, nutrient deficiency symptoms, symptoms observation and interpretations of soil test, plant tissue analysis, Fertiliser formulations, fertilisers application, methods of application, crop response to fertilisers application, economics of fertilisers use. Integrated nutrient management: organic and inorganic fertilisers, bio-fertilisers, nutrient management in hydroponic systems. Nutrient & water requirement for horticultural crops: nutrient requirement of horticultural crops, Irrigation requirement of horticultural crops. Green hydrogen and Ammonia production technologies and Agri-photovoltaic (Agri-PV) production systems. Bio Circular-Green Economy. Field Excursion: Before classes end, students will undertake a one-week field trip to Ministry of Agriculture and Ministry of Mines and Energy Soil Laboratory, Windhoek for exposure to various soil analyses and classifications,

Student Assessment Strategies

Continuous Assessment (at least 2 tests; 2 tutorial tests and 2 assignments): 50%; Examination: 50% (1x3 hour Examination paper). A student must obtain a minimum final mark of 50% to pass this module.

F6922TD	ADVANCED ORNAMENTAL HORTICULTURE AND LANDSCAPING
Module Title:	Advanced Ornamental Horticulture and Landscaping
Module Code	F6922TD
NQF Level	9
Notional Hours	120
Contact hours	2 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field excursions
NQF Credits	12
(Co-requisites)	
Prerequisite	Plant Propagation and Nursery Management
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

To equip students with advanced skills in modern landscaping techniques and architectural landscape designs.

Module Content

Sustainable design: sustainable practices; rain gardens; green roofs; permeable pavements; stormwater runoff; biodiversity enhancement; native and drought-tolerant plants; water consumption reduction; maintenance needs; regenerative design principles; landscapes; ecosystem health. Innovative plant selection: unique underutilised plant species; visually appealing and ecologically beneficial landscapes; plants with various textures, colours and forms; dynamic compositions throughout the year. Vertical landscaping: vertical gardens, living walls, trellises, limited space, air quality, aesthetic appeal, different plant species, captivating and visually striking patterns.

Smart Irrigation and Automation: advanced irrigation systems; moisture sensors; weather data integration; automated scheduling; water use optimisation; remotely controlled bright lighting and irrigation systems; energy efficiency; maintenance efforts. Virtual Reality (VR) and Augmented Reality (AR): VR and AR technologies. Biomimicry and Ecological Design: Inspiration from nature's patterns, processes and systems; resilient and harmonious landscapes; design habitats; natural ecosystems mimicry, biodiversity; and local wildlife. Art Integration: sculptures, installations, interactive elements, art and nature, creative

techniques, and mundane features like fences. Advanced Materials and Techniques: Innovative materials; recycled and repurposed elements; unique textures and aesthetics; construction techniques; environmental impact minimisation. Sensor Technology and Data Analysis: sensors, soil moisture, temperature, light levels, plant health. Holistic Wellness Landscaping: mental and physical well-being; meditation gardens; therapeutic planting; sensory experiences. Collaboration and Interdisciplinary Approaches: Collaboration with architects, urban planners, and ecologists; integrated landscapes. Field Excursion: Before classes end, students will undertake a one-week field trip to visit various farms, horticultural nurseries, and recreational parks in various towns such as Tsumeb, Otjiwarongo, Swakopmund as well as the Zoo Park and Parliamentary Garden in Windhoek to appreciate landscaping management practices.

Student Assessment Strategies

Continuous Assessment (minimum of 2 tests, 1 assignment, at least 5 Practicals): 50%. Examination: 50% (1 x 03 hours paper).

SECOND YEAR

F6993CG THESIS

Module Title:	Thesis
Module Code	F6993CG
NQF Level	9
Notional Hours	1200
Contact hours	On appointment with supervisor (s).
Additional learning requirements	None
NQF Credits	120
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This module aims to implement a research proposal for the development and submission of a graduation thesis for the Master of Science in Horticulture.

Module Content

This module entails developing and presenting a research proposal and its approval, conducting the research project, writing the thesis and presenting the research results. The student will submit a final report/thesis written following guideline for scientific writing, which should include but not be limited to the following:

1. Approved researchable topic
2. Abstract
3. Introduction /Background
4. Literature review
5. Methodology or Research Design
6. Results and findings
7. Conclusion and recommendation
8. References based on APA (UNAM adopted format).
9. Appendices (if any)

Student Assessment Strategies

Continuous Assessment (100%) consists of a research proposal write-up, seminal proposal presentation, thesis write-up, and seminar thesis presentation graded to obtain the final mark.

E.3.4.3 MASTER OF SCIENCE IN PLANT BREEDING (LEVEL 9) (31MSPB)

ADMISSION REQUIREMENTS

- A Bachelor Honours Degree in Horticulture (NQF level 8) or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%.
- Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
- A concept note reflecting research interest should accompany the application form.
- Selection of students will be based on academic performance, the concept note, available supervisory capacity.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Prerequisites	Compulsory (C) / Elective (E)
Year 1 Semester 1						
U6989LA	Academic Literacy for Postgraduate Students	9	16 non-contributing	L (4hr/wk)	None	C
F6911CA	Advanced Biometry in Crop Production	9	24	L (4hr/wk) P(3hr/wk)	None	**C**
F6931CB	Advanced Plant Breeding Techniques	9	24	L (4hr/wk) P (3hr/wk)	None	**C**
F6901CC	Seed Production System and Certification	9	12	L (2hr/wk) P (3hr/wk)	None	**C**
Total Credits Semester 1						60
Year 1 Semester 2						
F6922CD	Quantitative Genetics in Plant Breeding	9	12	L (2hr/wk) P (3hr/wk)	None	**C**
F6952CE	Breeding for Stress Tolerance	9	24	L (4hr/wk) P (3hr/wk)	None	**C**
F6972CF	Biotechnology, Bio-safety and Bioethics	9	24	L (4hr/wk) P (3hr/wk)	None	**C**
Total Credits Semester 2						**60**
Total credits YEAR 1						**60**
Module code	**Module name**	**NQF Level**	**Credits**	**Contact hours per week (L / P / T)**	**(Co-requisites) / Prerequisites**	**Compulsory (C) / Elective (E)**
Year 2 Semester 1						
F6973TG	Thesis	9	60	L (4hr/wk) P (3hr/wk)	None	C
Total Credits Semester 1			**60**			
Year 2 Semester 2						
F6973TG	Thesis	9	60	L (4hr/wk)	None	C

				P (3hr/wk)		
Total Credits Semester 2			**60**			
Total Credits Year 2			**120**			
TOTAL CREDITS FOR THE PROGRAM:			**240**			

MODULE DESCRIPTORS

FIRST YEAR

U6989LA ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS

Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.

Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.

Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.

Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies

100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6911CA ADVANCED BIOMETRY IN CROP PRODUCTION

Module Title:	Advanced Biometry in Crop Production
Module Code	F6911CA

NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

To expose students to the application of biometric and statistical methods for optimizing crop production systems.

Module Content

Introduction to advanced biometry in crop production; role of biometry in crop research and precision agriculture; importance of experimental design; and statistical analysis. Advanced statistical methods for crop data analysis: linear and nonlinear regression analysis, analysis of variance (ANOVA) with mixed effects, and multivariate statistical techniques. Experimental design in crop studies: randomized complete block designs (RCBD) and Latin squares, split-plot and factorial designs, BIBDS, and response surface methodologies. Mathematical modelling of crop growth and yield; differential equation models for crop growth, crop yield prediction models, simulation of growth-environment interactions. Optimization of crop production practices; resource allocation and optimization techniques; precision agriculture and variable rate technologies; decision support systems for crop management. Remote sensing and GIS applications in crop production; satellite imagery analysis for crop monitoring; spatial variability assessment and management zone delineation; precision agriculture mapping and prescription techniques. Case studies and practical exercises; real-world examples of biometry applications in crop production. Hands-on data analysis and modelling projects.

Student Assessment Strategies

Continuous assessment (a minimum of 2 tests, 1 assignment, at least 7 practicals): 40%; and Examination: 60% (1 x 3-hour paper).

A subminimum of 40% in the examination is required to pass, irrespective of the final mark

A student must obtain a minimum final mark of 50% to pass this module.

F6931CB ADVANCED PLANT BREEDING TECHNIQUES

Module Title:	Advanced Plant Breeding Techniques
Module Code	F6931CB
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

To provide students with scientific knowledge and technical skills for breeding and developing new crop varieties.

Module Content

Importance of plant breeding in feeding the world: Increase in numbers needing food, need for increased food availability and security, nutrition, the role of plant breeders in increasing food production, availability of nutritious foods, and climate-resilient crops. Steps in cultivar development: Define the target (Product Profile) based on value chain needs, create populations capable of reaching that target, and employ practical selection approaches to identify and retain those most closely meeting the target and activities preceding and following release. Effect of mating system on developing cultivars: Types of flower morphology and reproductive systems in plants, Methods of controlling mating, Effect of mating systems on methods of cultivar development. Creating a product profile: Mapping value-chain needs, identifying priorities for improvement based on importance and feasibility, and Identifying comparison varieties to equal or exceed specific traits. Creating desirable populations for pure-line crops: Identification and acquisition of appropriate parents to meet the objectives of a particular population, intermitting of selected parents, Comparison of methods to advancing generations, to produce potential lines, When to start progeny testing. Principles of selection: Balancing selection intensity and selection, differential vs effort required, Genetic gain formula (breeders' equation), Using genetic information to guide the testing strategy, Creating a rational selection funnel: Initial population size, Number of materials to test each generation (stage of testing). Number of reps, locations and seasons, applying stage gates, Participating in variety selection. Recurrent selection for population improvement: Types of recurrent selection, Processes involved in specific types of recurrent selection, Advantages and disadvantages of different types of recurrent selection. Inbred and hybrid development: Comparison of open-pollinated varieties with hybrids, Types of hybrids and their advantages and disadvantages, Improvement strategy—generally replace 1 inbred, Incorporation of test-crossing in the selection process, Characteristics of a successful inbred. Improvement of clonal crops: Genetic characteristics of clonal crops, Mating approaches for different clonal crop species, Selection process for clonal crops, Challenges of producing and distributing quality planting material of clonal crops. Preparations for cultivar release: National Performance Trial, On-farm trials, demonstrations, Criteria for release, Characterisation of Distinctness, Uniformity, Stability; Genetic fingerprinting, Seed increase strategy; Developing of agronomic recommendations; create info

sheets and publicity materials. Post-release activities: Supply foundation (pre-basic) seed, Monitor adoption, and Obtain feedback to define the product profile of replacement.

Student Assessment Strategies

This module will be assessed using both formative and summative assessment strategies. The formative assessment (Continuous Assessment) will contribute 50% (minimum of 2 tests, 1 assignment, at least 7 practicals), while the summative assessment (Examination) will contribute 50% (1 x 03 hours paper) of the total marks. To pass this module, a student must obtain a minimum final mark of 50%.

F6901CC	SEED PRODUCTION AND CERTIFICATION
Module Title:	Seed Production and Certification
Module Code	F6901CC
NQF Level	9
Notional Hours	120
Contact hours	2 Lecture hours per week 3 Practical hours per week
Additional learning requirements	Field trips/excursions and group work
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1

Module Purpose

To equip students with advanced knowledge of seed production, quality control and certification.

Module Content

Seed Biology and Physiology: Seed biology, germination, dormancy, and viability, and how these factors influence seed production and quality. Crop Reproduction and Breeding: Cross-pollination, self-pollination, and hybridisation, and how these principles influence seed production strategies. Seed Production Techniques: Techniques for seed production, including field management, isolation distances, pollination control, and use of growth regulators. Quality Control and Testing: Seed processing/ Conditioning: Importance of seed processing, Sequence of seed conditioning operations, Equipment used in seed conditioning, Relationship between seed conditioning and seed quality, Seed blending, priming, and dressing, Seed treatment methods and equipment, and Seed packaging. Seed Certification Systems: Objectives & importance of seed certification, Seed certification steps and principles, Minimum certification standards, labelling and sealing of seed lots, Seed Storage: Importance of seed Storage, Effect of storage conditions on seed viability and Quality, Seed storage equipment for critical crops, Pest and Disease Management: Diseases and insects pests of seeds and control methods, IPM in seed production. Genetic Diversity and Conservation: Business and Economics of Seed Production: Analyse the economic aspects of seed production, including cost analysis, market demand, and pricing strategies, to ensure sustainable business practices. Regulatory and Legal Frameworks: Comprehend the national and international regulations governing seed production, intellectual property rights, and phytosanitary measures to facilitate compliance. Ethics and Social Responsibility: Ethical considerations related to seed production, equitable seed access, biodiversity conservation, and responsible business practices.

Student Assessment Strategies

Continuous assessment (at least two tests; 5 practicals and 2 tests and 2 assignments): 50%; and Examination: 50% (1x3 hour Examination paper). A student must obtain a minimum final mark of 50% to pass this module.

SEMESTER TWO

F6922CD	QUANTITATIVE GENETICS IN PLANT BREEDING
Module Title:	Quantitative Genetics in Plant Breeding
Module Code	F6922CD
NQF Level	9
Notional Hours	120
Contact hours	2 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None
NQF Credits	12
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

This module will provide students with knowledge of quantitative genetics and statistical and mathematical applications in crop improvement. It will also equip students with the fundamentals of designing and implementing plant breeding and genetics experiments.

Module Content

An introduction to quantitative genetics and statistical tools; Population distributions ; Covariance, Régression, Corrélation analyses ; Causes of genetic variation: Properties of single loci; Applications of the Hardy Weinberg equilibrium; Mechanisms that generate and dissipate gametic disequilibrium; Sources of genetic variation for multi-locus traits: Genetic Linkage; Recombination; Linkage Maps; Components of phenotypic variation: Single locus expectation; Partitioning components of

phenotypic variance; Genotype x Environment interaction: Genetic correlations across environments; Two way analysis of variance; Concept of phenotypic stability; Resemblance between relatives; Measures of relatedness; Pedigrees; Genetic covariance between relatives; The concept of heritability: Parent-offspring regression; Response to selection; Selection index ; Analysis of line crosses: expectations for line cross means; Heterotic; inbreeding depression; Analysis of mating designs: North Carolina (NC) Designs I, II, and III; dialed mating designs; Hayman-Jinks analysis; Effect on the mean and variance; Inbreeding depression and heterotic; Marker-based analysis. Molecular markers; Genetic maps; Marker-trait association; Recombinant inbred lines. Quantitative Trait Locus (QTL) détection; QTL mapping experiments; Sib Analysis; Maximum likelihood functions; Genome scanning. Selected reading: such as measuring genetic variation and relatedness using molecular level makers, application of path coefficient analysis in breeding programs, Estimation of breeding values and their use in breeding programs, biometrical approaches to gene number estimation and Estimation of variance components using ML and REML

Assessment Strategies

Continuous assessment (at least two tests; 5 practicals and 2 tests and 2 assignments): 50%; and Examination: 50% (1x3 hour Examination paper). A student must obtain a minimum final mark of 50% to pass this module.

F6952CE	BREEDING FOR STRESS TOLERANCE
Module Title:	Breeding for Stress Tolerance
Module Code	F6952CE
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

To appraise various abiotic and biotic stresses influencing crop yield, mechanisms and genetics of resistance and methods to breed stress-resistant varieties.

Module Content

Abiotic and Biotic Stress in Crops: Improving crop resistance to stress – Genetic modification, adoption of GM crops; Recent Advances and Future Perspectives; Genetic Basis of Abiotic and Biotic Stress; Evolution and adaptation to stress tolerance; Role of Secondary metabolites in stress tolerance; Signaling in plant stress response. Procedures for identifying resistant types in crops: Marker-assisted Introgression of Major QTLs; Utilisation of Wild relatives as a source of resistance; Transgenics and the use of genetically engineered Bt crops. Utilisation of speed breeding methods: Mutagenesis to induce tolerance to biotic and abiotic stress resistance. Breeding for Biotic stresses: Significant pests and diseases of economically important crops; Concepts in insect and pathogen resistance; Analysis and inheritance of resistance variation. Host defense responses to pathogen invasions: Host-pathogen interaction; Concept of signal transduction and other host-defense mechanisms against viruses and bacteria; Acquired and induced immunity and systemic acquired resistance (SAR). Types and genetic mechanisms of resistance to biotic stresses: Horizontal and vertical resistance in crop plants; Quantitative/Adult plant resistance and Slow rusting resistance. Measuring plant resistance: Plant fitness; Behavioral, physiological and insect gain studies; Recording observations; Correlating the observations using marker data; Gene pyramiding methods and their implications. Phenotypic Screening Techniques and breeding strategies for resistance: Sucking pests and chewing pests - Traits to be observed at plant and insect level; Nematodes and borers; Weeds - ecological, environmental impacts on the crops; Fungal and Bacterial diseases.

Breeding for Abiotic Stresses: Abiotic stress-inducing factors – drought, flooding, acidity, salinity/alkalinity/sodicity, heat, cold/chilling, wind, mineral toxicity. Physiological and Phenological responses to abiotic stresses: Genetics of abiotic stress resistance; Genes and genomics in breeding cultivars for drought, flooding, heat, cold/chilling toxicity, nutrient deficiency and pollutants/contaminants.

Practical Phenotypic Screening Techniques and breeding strategies for resistance to abiotic stressors: Drought, flooding, acidity, salinity/alkalinity/sodicity, heat, cold/chilling, wind, and mineral toxicity. Species-Specific Case Studies: Wheat, Rice, Maize, Sorghum, Grain legumes, Cucurbits, Oil Crops, Vegetable crops and others.

Assessment Strategies

Continuous assessment (at least two tests; 7 practicals and 2 tests and 2 assignments): 50%; and Examination: 50% (1x3 hour Examination paper). A student must obtain a minimum final mark of 50% to pass this module.

F6972CF	BIOTECHNOLOGY, BIOSAFETY AND BIOETHICS
Module Title:	Biotechnology, Biosafety and Bioethics
Module Code	F6972CF
NQF Level	9
Notional Hours	240
Contact hours	4 Lecture hours per week 3 Practical hours per week
Additional learning requirements	None
NQF Credits	24
(Co-requisites)	

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 2

Module Purpose

To provide students with knowledge and skills on biotechnology and ethical and safety issues about research for development processes.

Module Content

Introduction: Scope of plant biotechnology (PB) and Biosafety. Biosafety in Agricultural Biotechnology: PB linkage with biosafety, Bioethics and bio policy, safety concerns in crop genetic engineering from lab to commercialisation of GMOs. Biosafety levels (BSL) and good lab management: Codes of conduct BSL 1 – 4. Biosafety Risk assessment: Review of dossiers including a) typical study designs for compositional analysis; b) virus, herbicide and insect pest resistance GE traits. Environmental concerns associated with genetically edited (GE) crops: Non-target effects; resistance in pathogen/pest populations; increased invasiveness/weediness, relative fitness and threats to landraces. Risk management: Containment and confinement strategies; pillars of risk mitigation. Biosafety monitoring: Categories experimentation, tracking and surveillance. Bioethics in plant biotechnology: Ethical concerns and respect for life, genetic engineering, cloning, stem cells and environmental degradation. Ethical concerns and regulatory framework: Legal protection liability and redress; international inventions, national policies, Intellectual Properties Rights. Issues in plant biotechnology (IPR): Forms of IPR, moral rights, and other contemporary issues in biotech development and its safe application, plant breeders rights, and UPOV convention

Assessment Strategies

Continuous assessment (at least two tests; 7 practicals and 2 assignments) will contribute 50%, and Examination (1x3-hour Examination paper) will contribute 50%. A student must obtain a minimum final mark of 50% to pass this module.

SECOND YEAR

F6973TG THESIS

Module Title:	Thesis
Module Code	F6973TG
NQF Level	9
Notional Hours	1200
Contact hours	3 Lecture hours per week.
Additional learning requirements	None
NQF Credits	120
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

This module aims to implement a research proposal for the development and submission of a graduation thesis for the Master of Science in Plant Breeding.

Module Content

This module entails developing and presenting a research proposal and its approval, conducting the research project, writing the thesis and presenting the results. Students will submit a final thesis written following guidelines for scientific writing, which should include but not be limited to the following:

- Approved researchable topic
- Abstract
- Introduction /Background
- Literature review
- Methodology or Research Design
- Results and findings
- Conclusion and recommendation
- References based on APA
- Appendices (if any)

In addition to the thesis, each student is expected to submit a manuscript for publication in a peer-reviewed UNAM-recognized scientific journal.

Student Assessment Strategies

Continuous assessment (100%) consists of a research proposal write-up, seminal proposal presentation, thesis write-up, and seminar thesis presentation—graded to obtain the final mark.

E.3.4.4 MASTER OF PHILOSOPHY IN CROP SCIENCE (31MPCS)

ADMISSION REQUIREMENTS

To be eligible for this Master of Philosophy in Crop Science programme, the candidate must have completed a bachelor's honours degree at NQF level 8 or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%.

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria, such as equity considerations or the high score/percentage obtained in honours.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	9	16 (non-contributing)	4 hours per week	N/A	C
F6993CA	Thesis	9	240	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	9
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.

Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.

Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.

Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.

Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.

Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F6993CA	THESIS
Module Title:	Thesis
Module Code	F6993CA
NQF Level	9
Notional Hours	2400
Contact hours	Face to face consultations with supervisor(s) on regular bases
Additional learning requirements	None
NQF Credits	240
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
This module is designed to broaden students' understanding of scientific principles in Crop Science and its applications through extensive literature review, design, development, analysis, interpretation, and management of major research projects independently, as well as documenting and presenting the results

Module Content
Core elements of the module include the support of academic skills such as:
1. Literature survey: A comprehensive compilation of literature surveys of studies and recent developments in the study area. The review should be presented chronologically in line with the study objectives. This is essential for developing and submitting a logical research proposal. Students shall be encouraged to access paper-based and online databases, abstracts, and articles relevant to the proposed research title.
2. Development of research title: The outcome of the literature survey will inform the student, under the guidance of the supervisor, of the need to amend (if necessary) the title of the research based on findings, intended scope of work and relevance of the research to the society, scientific, technological and industrial development. The ability to transform the conceptualised research idea into a proposal through the proposal writing process coherently and chronologically forms the basis of this learning stage—the presentation of the fully developed proposal before a departmental panel of academic staff and students.
3. Implementation of the approved research proposal: the student will implement the proposal through the stated research methodology/experimental process. Here, the student will demonstrate the ability to conduct independent research work under the guidance of a supervisor. Where an ethical clearance is required, the student will be required to apply for the research ethics certificate following the procedures of the University, and the student should seek assistance from the supervisor if challenges are encountered with ethical clearance issues.
4. Data presentation, interpretation and discussion: Skills and ability to apply relevant statistical analysis for data presentation and sound scientific and technical interpretation and discussion of the results will be displayed.
5. Scientific writing and Presentation skills: Students' written and oral presentation skills will be tested and improved. Here, the ability to summarise a report, e.g. synthesis, writing of abstract, conclusion and recommendations, will be evaluated. The student's knowledge in preparing research outcomes for scientific communication (draft manuscript, PowerPoint presentation) will be accessed.
6. Writing and submission of Thesis for assessment: The compilation of all the different sections of the research work into coherent chapters in the form of a thesis following the format of the Postgraduate Studies of the University.
7. Ethical procedures: Students must adhere to all ethical requirements for research work and processes approved by the University's Research Ethics committee during study. Each Master of Philosophy in Crop Science thesis should be accompanied by a certificate generated after running the document through a recognised plagiarism software, e.g., Turn-it-in, with a maximum similarity of 15%.
8. Formal presentation of Thesis: Students are expected to successfully present their Thesis in a viva voce following the Rules for Postgraduate Studies.
9. Development of a manuscript for publication in accredited journals

Student Assessment Strategies
The Thesis will be assessed according to UNAM Postgraduate Studies rules.
Year one for full-time (Years one and two for part-time)
- Submission and presentation of a comprehensive research proposal and concomitant research plan for approval after six months of registration (by the end of the first year of registration in case of part-time students);
- Pursue and obtain ethical clearance (if applicable to the study) once the proposal has been approved by the Higher Degree Committee (HDC).
- Presentation and approval of the first work-in-progress by the Department.
- Submission of the yearly progress report highlighting achievements and challenges encountered.

Year two for full-time (Years three and four for part-time)

- Presentation and approval of second work-in-progress after six months of the second year (by the end of the third year in case of part-time students);
- Submission and assessment of final research thesis;
- Presentation and defense of research thesis at the end of year two (by the end of the fourth year in case of part-time students);
- Correction and final binding (archiving) of a research thesis.
- Students who fail pre-assessments will receive an extension of six months (one year in the case of part-time students) as may be recommended by the supervisor.
- For determining the final mark of the Thesis for the degree, the procedures of the Postgraduate Studies will be applied in accordance with recommendation(s) from all the statutory thesis examiners.

E.3.4.5 DOCTOR OF PHILOSOPHY IN CROP SCIENCE (31DPCS)

ADMISSION REQUIREMENTS

- To be eligible for this PhD programme, the candidate must have completed a Master's degree at NQF level 9 or equivalent in a relevant discipline from a recognised higher education institution, with an average of at least 60%.
- Applicants with foreign qualifications must submit a certificate of evaluation from the Namibia Qualifications Authority (NQA).
- Along with the application, candidates must submit a detailed research proposal highlighting their proposed area of research, objectives, methodology and a review of existing literature. The research proposal will be evaluated for relevance, novelty, feasibility and availability of a supervisor.
- As per Section B. 3.3. of the Higher Degrees Policy Procedures, Rules and Regulations, the Department reviews the submitted concept note, identifies potential supervisor(s) and recommends the applicant for admission through the Admission and Examination Board, considering the applicant's fulfilment of the minimum admission requirements, availability of supervisors and space. As such, departments shall only recommend students for admission to higher degrees if they can supervise them. The University encourages co-supervision with academic staff members from within the University or other universities and industries where specialised knowledge is required. However, the main supervisor should be based at UNAM.

Additional Selection Criteria

Based on space availability, the final selection for qualifying candidates may be based on additional criteria, such as equity considerations or the high score/percentage obtained in the Master programmes.

PROGRAMME SCHEDULE

Module code	Module name	NQF Level	Credits	Contact hours per week (L / P / T)	(Co-requisites) / Pre-requisites	Compulsory (C) / Elective (E)
U6989LA	Academic Literacy for Postgraduate Students	10	16 (non-contributing)	4 hours per week	N/A	C
F7073CA	Dissertation	10	360	As per the arrangements with the supervisor(s)	N/A	C

MODULE DESCRIPTORS

FIRST YEAR

U6989LA	ACADEMIC LITERACY FOR POST-GRADUATE STUDENTS
Module Title:	Academic Literacy For Post-Graduate Students
Module Code	U6989LA
NQF Level	10
Notional Hours	160
Contact hours	(4 hours per week
Additional learning requirements	None
NQF Credits	16 non-contributing credits Students can take the module either in the 1st or 2nd semester, but they cannot do more than one registration in one year.
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose

The intended purpose of the proposed module, "Academic Literacy for Postgraduate Students," is specifically to cater for the academic literacy requirements specific to postgraduate students. The core objective of this module is to empower students with advanced skills in academic discourse that are indispensable for a wide array of academic endeavours..

Module Content

The module will cover the following:

Effective Digital Academic Research Methods: Introduction to advanced digital research methods; Conducting scholarly inquiries using digital databases, academic journals, and online repositories; Evaluating the credibility and reliability of digital sources.

Specialized Academic Vocabulary and Conventions: In-depth exploration of specialized academic vocabulary; Precision in using academic conventions in both spoken and written communication; Practical exercises and activities to reinforce vocabulary acquisition.

Ethical Academic Conduct: Understanding and practicing ethical guidelines in scholarly activities; Discussion on plagiarism, proper citation, and academic integrity; Case studies and scenarios emphasizing ethical decision-making.
Synthesis of Ideas from Diverse Sources: Techniques for synthesizing information from various academic sources; Application of synthesis skills to create cohesive and well-structured academic content; Collaborative exercises to promote diverse perspectives.
Interpretation of Research Data: Developing skills in interpreting data presented in tables and figures; Understanding graphical representation of research findings; Hands-on exercises for data interpretation and analysis.
Critical Reading and Text Analysis: Strategies for critical reading and analysis of scholarly texts; Identifying and evaluating arguments, assumptions, and evidence; Application of critical reading skills to enhance comprehension.
Integration of Academic Rhetoric and Style: Exploring academic rhetoric and stylistic elements in writing; Integrating varied perspectives while maintaining academic style; Peer review sessions focusing on rhetorical effectiveness.
Construction of Academic Texts: Crafting expository, persuasive, and argumentative academic texts; Structuring academic papers according to genre and purpose; Peer workshops for constructive feedback on text construction.
Effective Use of AI Tools: Introduction to AI tools for academic purposes; Practical applications of AI in research and writing; Hands-on sessions for using AI tools effectively.
Integration of AI Tools According to Policies: Understanding university policies and guidelines for AI tool usage; Applying AI tools in academic writing tasks within established frameworks; Compliance with ethical and legal considerations in AI tool integration.
Source Acknowledgment in University Studies: Importance of proper source acknowledgment in academic writing; Practical guidance on citing sources in various academic contexts; Citation styles and formatting for different disciplines.

Student assessment strategies
100% Continuous assessment (1 test and 1 assignment, 1 academic presentation, 1 text analysis)

F7073CA	DISSERTATION
Module Title:	Dissertation
Module Code	F7073CA
NQF Level	10
Notional Hours	3600
Contact hours	As per the arrangement with supervisor(s)
Additional learning requirements	None
NQF Credits	360
(Co-requisites)	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	Semester 1 & 2

Module Purpose
This course is designed to broaden students' understanding of scientific principles in Crop Science and its applications through extensive literature review and practical demonstration while carrying out original independent research. Students can independently design, develop, conduct, and manage major research projects, analyse data, and document and present the results. Students are expected to contribute uniquely to the existing Crop Science knowledge body..

Module Content
Core elements of the course include the support of academic skills such as:
Literature review: Comprehensive compilation of literature survey of studies and recent developments in the study area. The review should be presented chronologically in line with the study objectives. This is essential towards the development and submission of a logical research proposal. Students shall be encouraged to access paper-based and online databases, abstracts and articles relevant to the proposed research title.
Development of research title: The outcome of the literature survey will inform the student, under the guidance of the supervisor, of the need to amend (if necessary) the title of the research based on findings, intended scope of work and relevance of the research to society, scientific, technological and industrial development. The ability to transform the conceptualised research idea into a proposal through the proposal writing process coherently and chronologically forms the basis of this learning stage. Presentation of the fully developed proposal before a departmental panel of academic staff and students.
Implementation of the acceptable and approved research proposal (methodology/experimental process): At this stage, the student will implement the proposal through the stated methodology/experimental process. Here, the student will demonstrate the ability to conduct independent research work under the guidance of a supervisor. Where an ethical clearance is required, the student should apply for the research ethics certificate following the University's procedures, and the student should seek assistance from the supervisor if challenges are encountered with ethical clearance issues.
Data presentation, interpretation and discussion: Skills and ability to apply relevant statistical analysis for data presentation, as well as sound scientific and technical interpretation and discussion of the results, will be displayed.
Scientific writing and Presentation skills: Students' written and oral presentation skills will be tested and improved. Here, the ability to summarise a report, e.g. synthesis, writing of abstract, conclusion and recommendations, will be evaluated. The student's knowledge in preparing research outcomes for scientific communication (draft manuscript, PowerPoint presentation) will be assessed.

Writing and submission of dissertation for assessment: The compilation of all the different sections of the research work into coherent chapters in the form of a dissertation following the Postgraduate Studies format of the University.
Ethical procedures: Students must adhere to all ethical requirements for research work and processes as approved by the University's Research Ethics committee during study. Each PhD dissertation should be accompanied by a certificate generated after running the document through a recognised plagiarism software, e.g., Turn-It-In, with a maximum similarity of 15%.
Formal presentation of dissertation: Students are expected to successfully present their dissertation in a viva voce following the Rules for Postgraduate Studies.

Student Assessment Strategies
Progress reports will be submitted at six -month to assess progress and challenges which may require attention. On programme completion, the student will be assessed through a dissertation which documents the student's independent research work with significant contribution to existing knowledge in the subject research area, as well as through a viva voce examination which provides an opportunity for oral presentation and defense of a student's dissertation. The dissertation will be examined by an internal examiner from UNAM and an external examiner in accordance with the UNAM Postgraduate grading systems and timelines.

ANNEX 1

SUPERVISION AGREEMENT BETWEEN GRADUATE STUDENT AND SUPERVISOR

This supervision agreement between

Name of student: ……..

Student number: ……

Faculty: ……

Department: ……

and (on behalf of UNAM)

Name of supervisor: ……

Department: ……..

And (if applicable)

Name of co- supervisor: ……

Department: ……

Regarding post-graduate research for the degree of: ……..

Research topic: ……

……..……
……

By signing this document, both student and supervisor(s) acknowledge their understanding and obligations of the general expectations and responsibilities regarding the supervision of the thesis/dissertation as contained in the UNAM Postgraduate Studies regulations prospectus.

……	……	…..……
Name of Student	Signature	Date
……..	……	……
Name of Supervisor	Signature	Date
……..	……	……
Name of co-supervisor (where applicable)	Signature	Date
……..	……	……
Name of Department HoD	Signature	Date
……..	……	……
Name of Faculty HoD: PGS	Signature	Date

ANNEX 2

DECLARATIONS WHICH MUST BE CONTAINED IN THE SUBMITTED THESES/ DISSERTATIONS

Format of declarations to be included in every thesis/dissertation:

DECLARATIONS

I, [student's name], hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

No part of this thesis/dissertation may be reproduced, stored in any retrieval system, or transmitted in any form, or by means (e.g. electronic, mechanical, photocopying, recording or otherwise) without the prior permission of the author, or The University of Namibia in that behalf.

I, [student's name], grant The University of Namibia the right to reproduce this thesis in whole or in part, in any manner or format, which The University of Namibia may deem fit.

.....	.....	.....
Name of Student	Signature	Date

ANNEX 3A:

(To be completed by student for main and co-supervisors)

SCHOOL POSTGRADUATE STUDIES COMMITTEE

Semester……, 20……..

Student Name: ……

Student Number: ……

Postgraduate Programme Student is enrolled in: ……

Student Contact Details Tel and Email Address: ……..

Mode of study: Full Time/Part Time: ……

Academic year of first registration: ……

Research Title: ……..

Supervisor's Name: ……..

PROGRESS TO DATE:

a) On a scale of 1 to 5 (with 1 being poor and 5 excellent), indicate your progress according to your plan of study. If you rate 1-2, please provide details on a separate page. 1 2 3 4 5

b) Please indicate the frequency of your face to face academic consultation this semester with your supervisor 0 1-3 4-6 >6

c) Please indicate the frequency of other forms of academic communication with your supervisor (never, less frequent, more frequent) Telephone

e-mail

Social media

d) Are there any other problems/issues that you would like to draw to the attention of the Faculty/School Postgraduate Studies Committee?

If yes, have you discussed these problems with your Supervisor or Head of Department?

Has the problem been resolved?

Do you require any further intervention to address these issue(s)? If yes, please provide details on a separate page. YES NO

YES NO

YES NO

YES NO

Comments: (You may use a separate page for your comments)

…… …….. ……

Name of student Signature Date

…… …….. ……

Name of Departmental HOD Signature Date

ANNEX 3B:
(To be completed by each supervisor, main and co-supervisors)

SCHOOL POSTGRADUATE STUDIES COMMITTEE

Semester……20……

Student Name: ……

Student Number: ……

Postgraduate Programme Student is enrolled in: ……

Student Contact Details Tel and Email Address: ……

Mode of study: Full Time/Part Time: ……

Academic year of first registration: ……

Research Title: ……

Supervisor's Name: ……

PROGRESS TO DATE:

a) On a scale of 1 to 5 (with 1 being poor and 5 excellent), indicate student progress according to plan of study. If you rate 1-2, please provide details on a separate page. 1 2 3 4 5

b) Please indicate the frequency of your face to face academic consultation this semester with your student 0 1-3 4-6 >6

c) Please indicate the frequency of other forms of academic communication with your student (never, less frequent, more frequent)

Telephone

e-mail

Social media

d) Are there any other problems/issues that you would like to draw to the attention of the Faculty/School Postgraduate Studies Committee?

If yes, have you discussed these problems with the student or Head of Department?

Has the problem been resolved?

Do you require any further intervention to address these issue(s)? If yes, please provide details on a separate page. YES NO

YES NO

YES NO

YES NO

Comments: (You may use a separate page for your comments)

……	……	……
Name of Supervisor	Signature	Date
…….....	……..	……
Name of Department HoD	Signature	Date

ANNEX 4A: NOTICE OF INTENTION TO SUBMIT THESIS/DISSERTATION FOR EXAMINATION

(To be completed by student)

CENTRE FOR RESERCH SERVICES

Date ……

The Chairperson

School Higher Degrees Board

NOTICE OF INTENTION TO SUBMIT THESIS/DISSERTATION FOR EXAMINATION

I, (Name)_____ (Student no :_____) hereby notify the Postgraduate Studies Committee of my intention to submit my thesis / dissertation on _____ (date) for examination. I attach the abstract of my thesis/dissertation.

The title of my thesis/dissertation is:

……	……	…….
Name of Student	Signature	Date
……..	……	……..
Name of Supervisor (Main/Co-)	Signature	Date
……..	……	……
Name of HOD	Signature	Date
……..	……	……
Name of Faculty PG Coordinator	Signature	Date

ANNEX 4B: REQUEST FOR APPOINTMENT OF EXAMINERS

CENTRE FOR RESEARCH SERVICES

Student Number:

Surname and Initials:

Department

School

Faculty

Degree (Masters/PhD)

Title of thesis/dissertation:

Main Supervisor	Affiliation:
Co-Supervisor	Affiliation:
Co-Supervisor	Affiliation:
Co-Supervisor	Affiliation:
External Examiner	Affiliation:
External Examiner	Affiliation:
External Examiner	Affiliation:
Internal Examiner	Affiliation:

I hereby declare that there is no conflict of interest in the nomination of the abovementioned examiners.

…….. …… …..……..

Name of Independent Chair/HoD Signature Date

Recommended by SHDB on…….. Resolution no…….

…….. …… ……

Name of Faculty PG Coordinator Signature Date

ANNEX 5:

RECOMMENDED FORMAT OF SUMMARIZE CURRICULUM VITAE

CENTRE FOR RESEARCH SERVICES

The Abridged CV should be not more than three-pages long

Title: Initials:

Surname:

Name/s:

Academic or equivalent institution to which affiliated: Past: Present:

Present Academic Rank Professor

Work and employment experiences Past: Present:

Physical Contact Details (Courier Delivery Address):

Telephone numbers Office: Cell:

Email address/

Academic Qualifications and Year Obtained/Institution Qualification/s & Year/s Obtained

Area/s of Expertise/Specialisation Primary Secondary

Record of publications in the last 10 years

ARTICLES IN PEERED REVIEWED JOURNALS/PROCEEDINGS (top 10 recent)

Title & Authors: Journal/Proceedings Name

NATIONAL AND INTERNATIONAL CONFERENCES (top 10 recent)

Title & Authors & Conference

CONTRIBUTION IN BOOKS, CHAPTERS IN BOOKS ECT.(top 10 recent)

Title & Authors , Book & ISBN

List of key research projects undertaken or coordinated for the last 10 years, starting with the most recent:

Record of postgraduate student supervision for the last 10 years, starting with the most recent:

Title or Student Role Main/Co Supervisor

Examiner of post graduate studies

Title/Student & M/PhD

Other Academic related experiences/achievements

ANNEX 6

CENTRE FOR POSTGRADUATE STUDIES

CHECKLIST FOR SUBMITTING THESIS/DISSERTATION TO CPGS

(To be completed by the supervisor)

Faculty:

Department:

Degree registered for:

Name of Student:

Student Number:

Title of thesis/dissertation:

Name(s) of supervisor(s):

……
……

Date when the thesis/dissertation was sent to examiners: ……

Date when comments on the thesis/dissertation were received from examiners: ……

Table of corrections received from student: Yes…… No……

Supervisor(s) checked the thesis/dissertation to verify that the student made the revisions according to the table of corrections
Yes…… No……

Supervisor checked the thesis/dissertation for conformity with regards to formatting before binding:

Yes…… No……

…… …… ……

Name of Supervisor signature Date

…… …… ……

Name of HOD: department signature Date

Date when the bound copies of the thesis/dissertation were submitted to Faculty Postgraduate Studies Committee for inspection and noting……..

…… …… ……

Name of HOD: FPGS signature Date

All conditions pertaining to the submission of thesis/dissertation have been met

…… …… ……

Name of Faculty Officer CPGS signature Date

ANNEX 7

CENTRE FOR POSTGRADUATE STUDIES

WILLINGNESS TO SERVE AS AN EXAMINER AND DECLARATION OF POSSIBLE CONFLICT OF INTEREST

I , …….. am willing to serve as examiner for student …… and hereby declare the following possible areas of conflict of interest regarding the examination of the thesis/dissertation titled:
……
……
……..

POSSIBLE AREA OF CONFLICT	DETAILS
Family (e.g. cousin, in-law)	
Other Personal relationship (e.g. friend)	
Professional (e.g. colleague, research collaborator, co-author)	
Others	
None	

…… ……. ……..……

Name of Examiner Signature Date

ANNEX 8

EXAMINER APPOINTMENT LETTER

Date

Examiner Physical Address

Telephone

E-mail

Dear Prof/Dr XXX

Examination of Thesis/Dissertation: Mr./Ms. XXX

I am pleased to inform you that you have been appointed as an examiner for the above-mentioned student. The manuscript is enclosed herewith. Attached, also find the guidelines for the compilation of the report and the relevant forms to be filled in.

Please return the comprehensive report and completed forms in electronic format within 8 weeks from the date of receipt of the manuscript to the Director, Centre for Postgraduate Studies (directorpgs@unam.na). If there is a need to return the hardcopy of the manuscript, kindly do so via DHL to the return address provided. However, note that no reports or forms should accompany the manuscript.

Please acknowledge receipt of the manuscript. Should you be unable to complete the examination by the indicated time frame, given your other commitments, kindly inform me accordingly.

Best regards

Name

Director, Centre for Postgraduate Studies,

Tel: +264 61 206 3275

E-mail: directorpgs@unam.na

Cc. Faculty of xxxxxx HOD: Postgraduate Studies (e-mail)

ANNEX 9

MARK ALLOCATION OF MASTER's THESIS

Name of Student: ……..

Student Number: ……..

Thesis title: ……

……..

Assessment Criteria	Allocated mark	Maximum mark
Title: (appropriateness, clear and informative)		2
Abstract: (concise, outlines aim of study, methodology, findings and conclusions)		4
Introduction: background/orientation of study (sufficient and relevant)		3
Introduction: problem statement (clear and logical progression from literature to aims of the study)		3
Introduction: objectives/hypothesis/research questions (well formulated and relevant to the problem statement)		3
Literature review: (relevant, recent, critical, comprehensive and logically/theoretical integrated)		10
Research methods: (clear, detailed, informative, appropriate and supported by literature)		10
Results: Data collected (adequate and relevant)		7
Results: Data analysis (appropriate, relevant to aims and objectives/hypotheses/research questions)		10
Results: Data presented (technical aspects, appropriate, concise, informative and clear)		7
Discussions: Critical, comprehensive, logically integrated, linked to literature, acknowledgment and discussion of limitations, significance and implications of the findings		25
Conclusion and recommendations: clear, concise and supported by data, findings must relate/respond to the objectives/hypotheses/research questions. Recommendations must be linked to the findings		5
Contribution to knowledge: originality and relevance to subject area		3
References: Appropriate format, consistency between in-text citation and reference list		5
Language and technicalities: clear and legible language use and format		3
TOTAL		100

…….. …… ……

Name of Examiner Signature Date

ANNEX 10

SUMMARY OF EXAMINATION RESULTS (MASTER THESIS)

Name of student: ……

Thesis title: ……

……..

……..

Faculty:…….....

EXAMINERS RECOMMENDATIONS (X)

1. Thesis PASSES subject to MINOR corrections

Mark allocated: …… (> 50%)

2. Thesis PASSES subject to MAJOR corrections as indicated in the report

Mark allocated: …… (> 50%)

3. Thesis MUST BE RE-SUBMITTED FOR RE-EXAMINATION after one or more of the following (specify):

(No mark to be allocated)

3.1 Additional literature review

3.2 Additional data collection

3.3 Additional data analysis

3.4 Thesis re-write

3.5 Other (specify in Main Report)

4. Thesis FAILED (reasons specified in Main Report).

Mark allocated: …… (< 50%)

…….. …… ……

Name of Examiner Signature Date

Interpretation of the grading scale:

% Equivalence	Interpretation
80 and above	Distinction
70 – 79	Very Good
60 – 69	Good
50 – 59	Satisfactory
49 and below	Fail

ANNEX 11

SUMMARY OF EXAMINATION RESULTS (PhD/DOCTORAL DISSERTATION)

Name of student: ……

Dissertation Title: ……

……..

……..

Faculty:…….....

EXAMINERS RECOMMENDATIONS (X)

1. Dissertation PASSES subject to MINOR corrections
2. Dissertation PASSES subject to MAJOR corrections as indicated in the report
3. Dissertation MUST BE RE-SUBMITTED FOR RE-EXAMINATION after one or more of the following (specify):
   - 3.1 Additional literature review
   - 3.2 Additional data collection
   - 3.3 Additional data analysis
   - 3.4 Dissertation re-write
   - 3.5 Other (specify in Main Report)
4. Dissertation FAILED (reasons specified in Main Report).

…….. …… ……

Name of Examiner Signature Date

ANNEX 12

VIVA VOCE EXAMINATION RESULTS FORM (NO MARK SHOULD BE ALLOCATED – ONLY PASS/FAIL)

(To be attached to the detailed report by the Viva Voce Chairperson)

Name of Student: ……

Degree registered for: ……

Thesis/Dissertation Title: ……

……

……

Date: ……

No.	EXAMINERS' RECOMMENDATION	(X)
1.	PASS	
1.1	Student PASSES and no additional adjustments are required.	
1.2	Student PASSES SUBJECT TO minor corrections and revisions	
2.	FAIL	
2.1	Student FAILS, but should be given another chance of defending the thesis/dissertation after rectifying the identified weaknesses	
2.2	Student FAILS OUTRIGHT	

Name*	Designation	AffiliationSignature
	Chairperson	
	External Examiner	
	External Examiner	
	External/Internal Examiner	
	Main supervisor	
	Co-supervisor	
	Co-supervisor	
	Other	

- The VIVA VOCE Panel Chairperson should prepare a more detailed report according to instructions contained in B.16.3 under Viva voce Examinations.
- In case of disagreement, each panellist shall show against his/her signature which recommendation (e.g., 1.1, 1.2, 2.1 or 2.2) s/he prefers.

ANNEX 13
TEMPLATE FOR VIVA VOCE CHAIRPERSON REPORT

Name of Student: ……..

Degree registered for: ……

Thesis/Dissertation Title: ……

……
……

Date of Viva Voce examination : ……

1. Panel members in attendance
2. Challenges faced with the examination (e.g. logistical arrangements)
3. Summary of the presentation by the student
4. Summary of the discussions during the examination
5. Strong and/or weak points identified during the presentation and discussions
6. Specific recommendations to the student where applicable

We hereby declare that this report is a true reflection of the Viva Voce examination:

Name*	Designation	AffiliationSignature
	Chairperson	
	External Examiner	
	External Examiner	
	External/Internal Examiner	
	Main supervisor	
	Co-supervisor	
	Co-supervisor	
	Other	

External panelists who are unable to sign off the report must acknowledge approval of the report via e-mail

ANNEX 14
(Research Proposal/Summary/Mini Thesis/Thesis/Dissertation title page)

EVALUATION OF SELECTED NAMIBIAN MEDICINAL PLANTS FOR ANTI-HIV PROPERTIES

A RESEARCH PROPOSAL/ A MINI THESIS/THESIS/DISSERTATION SUBMITTED IN PARTIAL FULFILMENT/FULFILMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE (SPECIFIC DEGREE NAME IN FULL)/DOCTOR OF PHILOSOPHY IN SCIENCE (BIOLOGICAL SCIENCES)

OF

THE UNIVERSITY OF NAMIBIA

BY

.....

(NAME OF STUDENT)

.....

(STUDENT NUMBER)

.....

MONTH AND YEAR OF GRADUATION

MAIN SUPERVISOR: Name (Affiliation)……

CO-SUPERVISOR(S): Name (Affiliation)……

NB: INDICATE IN FULFILMENT WHEN THERE IS NO COURSEWORK AND IN PARTIAL FULFILMENT WHEN THERE IS COURSEWORK

ANNEX 15

CENTRE FOR POSTGRADUATE STUDIES

CHECKLIST FOR APPROVAL OF RESEARCH PROPOSALS (TO BE COMPLETED BY THE SUPERVISOR)

Faculty: …… Department: ……..……

Postgraduate Programme Student is enrolled in: ……..

Name of Student: …… Student number: ...……

Title of Study to be conducted: ……

Instructions: Tick (√) YES or NO in the space provided to indicate whether particular actions and tasks were undertaken. In addition, indicate the dates when the actions or tasks were undertaken.

	NATURE OF ACTION TAKEN	RESPONSE CHOICES	DATE WHEN ACTION WAS TAKEN
1	The student is registered at UNAM for the current academic year	YES NO	
2	The research proposal has been prepared under the guidance of a supervisor or supervisors.	YES NO	
3	The student successfully completed the seminar at department and/or faculty level.	YES NO	
4	The research proposal has been considered and recommended at departmental level.	YES NO	
5	The research proposal has been considered by the Faculty Postgraduate Studies Committee the following resolution was taken:		

RESOLUTION NUMBER: …… Approved

Rejected

Extended

6 Where extension was granted and the proposal re submitted, the research proposal has been considered by the School Higher Degrees Board the following resolution was taken:

RESOLUTION NUMBER: …… Approved

Rejected

7 The research proposal has been submitted to the UNAM PGSC for noting. YES NO

…… …….. ……

Name of the Main Supervisor Signature of the Main Supervisor Date:

…… …….. ……

Name of the Co-Supervisor Signature of the Co- Supervisor Date:

Name and Signature of the Faculty PGSC Chairperson: ……

Date:……

ANNEX 16

RESEARCH PERMISSION LETTER

Student Name

Student number

Programme

Approved research title

TO WHOM IT MAY CONCERN

I hereby confirm that the above-mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

---------- ……..

Name Date

Director: Centre for Postgraduate Studies

Tel: +264 61 2063275

E-mail:

APPENDIX 1: MODULE EQUIVALENCE (Diploma and Degree Programmes)

Diploma in Agriculture versus Diploma in Livestock Production

Old modules	NQF Level	Credits	New modules	NQF Level	Credits
Mathematics and Basic Statistics	**4**	**16**	**Elementary agricultural mathematics and statistics,** **Introduction to Statistics**	**4** **5**	**12** **14**
Biology	**4**	**16**	**Principles of Biology**	**4**	**14**
Farm Duties I	**4**	**8**	**None**	**-**	**-**
Basic Economics	**4**	**12**	**Basic Economics**	**4**	**12**
Physical Science	**4**	**12**	**None**	**-**	**-**
Animal Anatomy, Physiology and Reproduction	**4**	**8**	**Animal Anatomy and Physiology**	**5**	**16**
Financial Management	**5**	**8**	**Farm Management**	**6**	**16**
Communication and Information systems	**5**	**8**	**None**	**-**	**-**
Introduction to Rural Sociology	**5**	**8**	**None**	**-**	**-**
Soil Science	**5**	**12**	**Soil Science**	**5**	**14**
Applied Animal Health	**5**	**16**	**Farm Animal Health**	**6**	**18**
Farm Duties II	**5**	**8**	**Farm Duties**	**6**	**8**
Introduction to Research	**5**	**12**	**None**	**-**	**-**
Workshop Technology, Surveying and Farm Structures	**5**	**8**	**Farm Mechanization**	**4**	**7**
Vegetable and Fruit Production	**5**	**16**	**Olericulture Technology**	**4**	**14**
Crop Production	**5**	**12**	**Principles of Crop Production**	**4**	**14**
Applied Animal Breeding	**5**	**8**	**Applied Animal Breeding**	**5**	**16**
Special Study	**6**	**8**	**None**	**-**	**-**
Field Attachment	**6**	**8**	**Field Attachment**	**6**	**16**
Principles of Agricultural Extension	**6**	**8**	**Agricultural Extension and Group Dynamics**	**6**	**14**
Agricultural Marketing and Policy	**6**	**8**	**Agricultural Marketing and Policy**	**6**	**9**
Intensive Animal Production	**6**	**12**	**Intensive Animal Production**	**6**	**18**
Water Management and Soil Conservation	**6**	**8**	**None**	**-**	**-**
Range Management	**6**	**12**	**Range Management**	**6**	**18**
Special Study	**6**	**8**	**None**	**-**	**-**
Project Management	**6**	**8**	**None**	**-**	**-**
Entrepreneurship	**6**	**8**	**None**	**-**	**-**
Animal Nutrition and Feeding	**6**	**8**	**None**	**-**	**-**
Game Ranching	**6**	**8**	**None**	**-**	**-**
Extensive Animal Production	**6**	**8**	**Extensive Animal Production**	**6**	**18**
Farm Power & Machinery	**6**	**12**	**Farm Mechanization**	**4**	**7**
None	**-**	**-**	**Livestock Production Systems**	**5**	**14**

Diploma in Agriculture versus Diploma in Sustainable Crop Production and Technology.

Module Code	Old Programme	NQF Level	Credits	Module Code	New Programme Equivalent Modules	NQF Level	NQF Credit
AAEC 2411	**Mathematics and Basic Statistics**	**4**	**16**	**F2531CA**	**Elementary**	**4**	**12**
AASC 2431	**Biology**	**4**	**16**	**F2401CB**	**Introduction to Botany**	**4**	**7**
AACA 2400	**Farm Duties 1**	**4**	**8**		**None**		
AAEC 2482	**Basic Economics**	**5**	**12**		**None**		
AASC 2432	**Physical Science**	**5**	**16**		**None**		
AASC 2422	**Animal Anatomy, Physiology and**	**5**	**8**		**None**	**5**	**8**
AAEC 2541	**Communication and Information**	**5**	**8**	**F2641EC**	**Agricultural Extension and**	**6**	**14**
AAEC 2501	**Financial Management**	**5**	**8**		**None**		
AAEC 2521	**Introduction to Rural Sociology**	**5**	**8**	**F2412ED**	**Community Development and Rural Sociology**	**4**	**12**
ACSC 2581	**Soil Science**	**5**	**12**	**F2552CN**	**Soil Science**	**5**	**14**
AASC 2551	**Applied Animal Health**	**5**	**16**		**None**		
AACA 2500	**Farm Duties II**	**5**	**8**		**None**		
ACSC 2582	**Introduction to Research**	**5**	**12**		**None**		
ACSC 2522	**Workshop technology,**	**5**	**8**	**F2432TG**	**Workshop Technology and Farm Structures**	**4**	**14**
ACSC 2532	**Vegetable and Fruit Production**	**5**	**16**	**F2431CO**	**Olericulture Technology**	**4**	**14**
ACSC 2592	**Crop Production**	**5**	**12**	**F2421CI**	**Integrated Crop Farming**	**4**	**14**
AAEC 2502	**Applied Animal Breeding**	**5**	**8**		**None**		
AACA 2600	**Special Study**	**6**	**8**		**None**		
AACA 2601	**Field Attachment**	**6**	**8**	**W2600CM**	**Field Attachment**	**6**	**24**
AAEC 2641	**Principles of Agricultural Extension**	**6**	**8**	**F2641EC**	**Agricultural Extension and Group Dynamics**	**6**	**14**
AAEC 2661	**Agricultural Marketing and**	**6**	**8**		**None**		
AASC 2681	**Intensive Animal Production**	**6**	**12**		**None**		
ACSC 2601	**Water Management and**	**6**	**8**	**F2602TS**	**Soil and Water Conservation**	**6**	**8**
AASC 2691	**Range Management**	**6**	**12**		**None**		
AAEC 2602	**Project Management**	**6**	**8**	**U3420PJ**	**Project Management Skills**	**5**	2
AEC 2622	**Entrepreneurship**	**6**	**8**	**F2531EB**	**Entrepreneurship and Business Development**	**5**	**12**
AASC2	**Animal nutrition**	**6**	**8**		**None**		
AASC 2602	**Game Farming**	**6**	**8**		**None**		

AASC 2642	**Extensive Animal Production**	**6**	**8**		**None**		
ACSC 2682	**Farm Power and Machinery**	**6**	**12**	**F2612TF**	**Farm Power and Machinery**	**6**	**16**
ACSC 2622	**Crop Protection**	**6**	**8**	**F2601CH**	**Crop Protection**	**6**	**16**

Modules from older curricula with no equivalents will be offered again until either phased out or for a maximum of 2 consecutive times only. The Department reserves the right to offer these in whatever mode logistics allow (blended or online

Bachelor of Science in Agriculture (Crop Science) Hons versus Bachelor of Science in Crop Production.

B.Sc. in Agriculture (Crop Science) Hons				B.Sc. Crop Production			
Code	Old Module Equivalents	NOF Level	Credits	Code	New Modules	NQF Level	Credits
SBGL 3511	**Introduction to Biology**	**5**	**16**	**None**	**None**		
SPHY 3501	**Physics for Life Sciences I**	**5**	**8**	**None**	**None**		
SMAT 3511	**Basic Mathematics**	**5**	**16**	**F3531CA**	**Mathematics for Agriculture**	**5**	**12**
SCHM 3532	**Chemistry for Life Sciences**	**5**	**16**	**None**	**None**		
SPHY 3532	**Physics for Life Sciences II**	**5**	**16**	**None**	**None**		
SBGL 3512	**Diversity of Life**	**5**	**16**	**None**	**None**		
SMAT 3512	**Pre-calculus**	**5**	**16**	**None**	**None**		
AAEC 3681	**Principles Microeconomics**	**6**	**12**	**None**	**None**		
AAEC 3691	**Rural Sociology**	**6**	**12**	**None**	**None**		
AASC 3681	**Genetics**	**6**	**12**	**F3502CN**	**Plant Genetics**	**5**	**7**
ACRS 3682	**Soil Science for crop production**	**6**	**12**	**F3511CP**	**Soil Science**	**5**	**14**
ACSC 3681	**Plant Science**	**6**	**12**	**F3522CS**	**Plant Science**	**5**	**14**
ACSC 3691	**Agronomy**	**6**	**12**	**F3521CG**	**Principles of Agronomy**	**5**	**7**
AAEC 3681	**Production Economics**	**6**	**12**	**None**	**None**		
AAEC 3692	**Principles of Macroeconomics**	**6**	**12**	**None**	**None**		
AASC 3612	**Biochemistry**	**6**	**16**	**F2502CY**	**Plant Biochemistry**	**7**	**18**
AASC 3602	**Livestock Production Systems**	**6**	**8**	**None**	**None**		
ACRS 3681	**Biostatistics**	**6**	**12**	**F3512CI**	**Introduction to Statistics**	**5**	**12**
ACSE 3781	**Agricultural Engineering**	**7**	**12**	**F3612TE**	**Agricultural Engineering**	**6**	**16**
ACSC 3791	**Field Crop Production**	**7**	**12**	**F3631CC**	**Field Crop Production**	**6**	**16**
ACSC 3712	**Weed Science**	**7**	**8**	**F3501CW**	**Basic Weed Science**	**5**	**7**
AACA 3701	**Field attachment I**	**7**	**8**	**W3700CZ**	**Field Attachment for Crop Science**	**7**	**24**
ACSC 3741	**Horticulture Vegetables, Herbs and Spices**	**7**	**8**	**F3711CV**	**Vegetable Production**	**7**	**18**
ACRS 3781	**Plant Breeding**	**7**	**12**	**F3601CY**	**Principles of Plant Breeding**	**6**	**16**
AAEC 3781	**Farm Planning and Management**	**7**	**12**	**None**	**None**		

ACSC 3792	**Research Methods**	**7**	**12**	**F3712CB**	**Biometry**	**7**	**16**
ACSC 3702	**Crop**	**7**	**8**	**F3611CK**	**Crop Ecophysiology**	**6**	**16**
ACSC 3722	**Crop Handling and Storage**	**7**	**8**	**F3612TE**	**Agricultural Engineering**	**6**	**16**
ACSC 3742	**Farm Mechanisation**	**7**	**8**	**F3612TE**	**Agricultural Engineering**	**6**	**16**
AAEC 3712	**Agriculture Extension**	**7**	**16**	**F3632EE**	**Agricultural Extension and Group Dynamics**	**6**	**14**
AAEC 3782	**Agriculture Marketing**	**7**	**12**	**F3602CJ**	**Preparation for Crop Production Project**	**6**	**8**

Bachelor of Science in Agricultural Economics

The following table presents the summary of the modules in the old programme and new programme: Bachelor of

Old Modules	Module Code	NQF Level	Credit	Equivalent Modules	Module Code	NQF Level	Credit
Introduction to Biology	**SBLG3511**	**5**	**16**	**None -to be offered again**		**5**	**16**
Basic Microeconomics	**CEMI3522**	**5**	**16**	**Introduction to Microeconomics**	**F3511EB**	**5**	**12**
Basic Mathematics	**SMAT3511**	**5**	**16**	**Introduction to Mathematics for Economists**	**F3531EM**	**5**	**12**
Basic Macroeconomics	**CEMI3572**	**5**	**16**	**Introduction to Macroeconomics**	**F3512EB**	**5**	**12**
Diversity of Life	**SBLG3502**	**5**	**16**	**Diversity of Life**	**S3512ED**	**5**	**16**
Pre-calculus	**SMAT3512**	**5**	**16**	**Introduction to Mathematics for Economists**	**F3512EB**	**5**	**12**
Introduction to Statistics	**SSTS3522**	**5**	**16**	**Introduction to Statistics**	**F3532AS**	**5**	**12**
Intermediate Microeconomics	**AEI3681**	**6**	**16**	**Intermediate Economics**	**F3631EI**	**6**	**14**
Rural Sociology	**AEC3691**	**6**	**16**	**Community Development and Rural Sociology**	**F3631ES**	**6**	**14**
Financial Management	**AEF3681**	**6**	**12**	**Agricultural Finance**	**F3532EB**	**6**	**14**
Agricultural Communication and Group Dynamics	**AEA3681**	**6**	**16**	**None -to be offered again**		**6**	**16**
Agronomy	**ACS3691**	**6**	**16**	**Principles of Agronomy**	**F3521CE**	**6**	**14**
Production Economics	**AEC3682**	**6**	**12**	**Production Economics**	**F3631EP**	**6**	**14**
Intermediate Macroeconomics	**AEI3682**	**6**	**12**	**Intermediate Economics**	**F3631EI**	**6**	**14**

Mathematical Economics & Linear Programming	AEC3612	6	16	Mathematics for Economists II	F3652EM	6	14
Livestock Production Systems	ASC3602	6	8	None - to be offered again		6	8
Food Technology	FST3602	6	8	None -to be offered again		6	8
Field Attachment I	ACA3701	7	8	Agricultural Economics Practices (CWIE)	F3602EA	7	24
Field Attachment II	ACA3801	8	8	None, to be offered again		8	8
Agricultural Engineering	CSE3781	7	12	None, to be offered again		7	12
Econometrics	AEC3751	7	16	Econometrics for Agricultural Economists	F3731EE	7	14
Farm Planning and Management	AEC3781	7	16	Farm Management	F3612EF	7	14
Development Economics	AED3781	8	16	None -to be offered again		8	16
Research Methodology in Agric. Economics	AER3782	7	16	Economic Methods in Agribusiness & Economics	F3751EM	7	16
Agricultural Extension	AEC3712	7	16	None -to be offered again		7	16
Entrepreneurship	AEC3702	7	8	Entrepreneurship	F3712EE	7	16
Crop Storage and Handling	CSC3722	7	16	None -to be offered again		7	16
Agricultural Price Analysis and Forecasting	AEA3782	7	16	Agricultural Price Analysis & Forecasting	F3711EP	7	16
Agricultural Marketing	AEC3782	7	16	Agricultural Marketing	F3732EA	7	16
Resource Economics	AER3781	7	12	None -to be offered again		7	12
Research Project in Agricultural Economics	AEC3810	8	16	None -to be offered again		8	16
Project Planning and Management	AEC3881	8	12	None -to be offered again		8	12
International Agricultural Trade	AEC3891	8	12	None -to be offered again		8	12
Beef Production	ASC3881	8	12	None -to be offered again		8	12
Agricultural Policy Analysis	AEA3782	8	12	None -to be offered again		8	12
Agric. Business Management	AEA3882	8	12	None -to be offered again		8	12
Small Ruminant Production	ASC3892	8	12	None -to be offered again		8	12
Rural Development	AEC3842	8	8	None -to be offered again		8	8

Bachelor of Science in Animal Science Honours

OLD MODULES EQUIVALENTS	Module Code	NQF Level	Credits	NEW MODULE	Module Code	NQF Level	Credits
Introduction to Biology	**SBLG3511**	**5**	**16**	**Introduction to Biochemistry**	**F3511AB**	**5**	**14**
Physics for Life Sciences I	**SPHY3501**	**5**	**8**	**General Physics I**	**P3511PG**	**5**	**14**
Basic Mathematics	**SMAT3511**	**5**	**16**	**Mathematics in Agriculture**	**F3531CA**	**5**	**12**
Chemistry for Life Sciences	**SCHM3532**	**5**	**16**	**None, to be offered again**		**5**	**16**
Physics for Life Sciences II	**SPHY3532**	**5**	**16**	**General Physics II**	**S3512PG**	**5**	**14**
Diversity of life	**SBLG3502**	**5**	**16**	**Diversity of life**	**S3512ED**	**5**	**16**
Pre-calculus	**SMAT3512**	**5**	**12**	**None, to be offered again**		**5**	**12**
Principles of Microeconomics	**AAEC3681**	**6**	**12**	**Principles of Economics**	**F3611AE**	**6**	**14**
Rural Sociology	**AEC3691**	**6**	**16**	**Community Development and Rural Sociology**	**F3631ES**	**6**	**14**
Genetics	**AASC3681**	**6**	**12**	**None, to be offered again**		**6**	**12**
Introduction to Range Management	**AASC3691**	**6**	**12**	**None, to be offered again**		**6**	**12**
Biostatistics	**ACRS3681**	**6**	**12**	**Introduction to Statistics**	**F3532AS**	**6**	**12**
Agronomy	**ACS3691**	**6**	**12**	**None, to be offered again**		**6**	**12**
General Microbiology	**AFST3681**	**6**	**12**	**General Microbiology**	**F3611SG**	**6**	**15**
Production Economics	**AAEC3682**	**6**	**12**	**None**		**6**	**12**
Biochemistry	**AASC3612**	**6**	**16**	**Biochemistry**	**F3611AB**	**6**	**16**
Livestock Production Systems	**F3512AL**	**6**	**8**	**None, to be offered again**		**6**	**8**
Food Technology	**AFST 3602**	**6**	**8**	**None, to be offered again**		**6**	**8**
Field Attachment I	**AACA 3701**	**7**	**8**	**Field Attachment for Animal Scientists**	**F3783AA**	**7**	**24**
Animal Nutrition	**AASC 3701**	**7**	**8**	**None, to be offered again**		**7**	**8**
Agricultural Engineering	**ACSE 3781**	**7**	**12**	**None, to be offered again**		**7**	**12**
Animal Health	**AASC 3791**	**7**	**12**	**Animal Health**	**F3712AH**	**7**	**17**
Animal Breeding	**AASC 3792**	**7**	**12**	**Animal Breeding**	**F3732AA**	**7**	**18**
Farm Planning and Management	**AAEC 3781**	**7**	**12**	**Farm Management**	**F3612EF**	**7**	**14**
Animal Anatomy and Physiology	**AASC 3711**	**7**	**16**	**None, to be offered again**		**7**	**16**
Research Methods	**ACSC 3792**	**7**	**12**	**Biometry**	**F3712CB**	**7**	**16**
Agricultural Extension	**AAEC 3712**	**7**	**16**	**None, to be offered again**		**7**	**16**
Feeds and Feeding	**AASF 3702**	**7**	**8**	**None, to be offered again**		**7**	**8**
Game Ranching	**AASC 3741**	**7**	**8**	**Game Ranching**	**F3601AG**	**8**	**16**
Entrepreneurship	**AAEC 3702**	**7**	**8**	**Entrepreneurship**	**F3731AE**	**7**	**16**
Agricultural Marketing	**AAEC3782**	**7**	**12**	**Agricultural Marketing**	**F3711EP**	**7**	**16**
Field Attachment II	**AACA 3801**	**7**	**8**	**Animal Science Practices and Equipment**	**F3711AP**	**8**	**18**
Research Project	**ACSC 3810**	**8**	**16**	**Research Project**	**F3883AR**	**8**	**16**
Project Planning and Management	**AAEC 3881**	**8**	**12**	**None, to be offered again**		**8**	**12**
Range and Pasture Management	**AASC 3811**	**8**	**16**	**Range Management**	**F3831AP**	**8**	**20**

Beef Production	**AASC 3881**	**8**	**12**	**Beef Production**	**F3811AB**	**8**	**20**
Poultry Production	**AASC 3821**	**8**	**8**	**Monogastric Animal Production**	**F3832AM**	**8**	**20**
Small Ruminant Production	**AASC3892**	**8**	**12**	**Small Ruminant Production**	**F3812AS**	**8**	**20**
Dairy Production	**AASC 3810**	**8**	**8**	**Dairy Production**	**F3802AD**	**8**	**10**
Meat Science	**AASM 3882**	**8**	**12**	**Meat Science and Animal Products**	**F3801AM**	**8**	**10**
Biotechnology of Animal Reproduction	**AASB 3882**	**8**	**12**	**None, to be offered again**		**8**	**12**
Pig Production	**AASC 3822**	**8**	**8**	**Monogastric Animal Production**	**F3832AM**	**8**	**20**

Bachelor of Science in Agricultural Engineering Honours

Current Module Title	2021 CODE	NQF level	Credit	Replacement Module Title	2023 CODE	NQF level	Credit
YEAR 1 Semester 1							
Engineering Mathematics I	**TEGM3591**	**5**	**12**	**Engineering Mathematics I**	**I3511IM**	**5**	**16**
Engineering Drawing	**TEGT3561**	**5**	**8**	**Engineering Drawing**	**I3531ID**	**5**	**16**
Physics for Physical Sciences I	**SPHY3511**	**5**	**16**	**Physics for Engineers** I	**I3521NP**	**5**	**12**
Computing Fundamentals	**TCME3521**	**5**	**8**	**Computing Fundamentals**	**I3551CC**	**5**	**12**
Workshop Practice	**TEGW3590**	**5**	**8**	**Workshop Practice**	**I3640IW**	**6**	**8**
Materials Science	**TEGS3591**	**5**	**12**	**Materials Science**	**I3572IS**	**5**	**12**
Fundamentals of Engineering	**TEGT3521**	**5**	**8**	**None equivalent, to be offered again**		**5**	**8**
YEAR 1 Semester 2							
Engineering Mathematics II	**TEGM3512**	**5**	**16**	**Engineering Mathematics II**	**I3512IM**	**5**	**16**
Fundamentals of Electrical Engineering	**TEGT3542**	**5**	**8**	**Fundamentals of Electrical Engineering**	**I3502EE**	**5**	**8**
Physics for Physical Sciences II	**SPHY3512**	**5**	**16**	**Physics for Engineers II**	**I3542NP**	**5**	**13**
Engineering Mechanics I	**TEGT3592**	**5**	**12**	**Engineering Mechanics I**	**I3532NM**	**5**	**12**
Chemistry 1B	**SCHM3512**	**5**	**16**	**Chemistry for Engineers**	**I3511NC**	**5**	**16**

YEAR 2 Semester 1							
Engineering Mathematics III	**TEGT3671**	**6**	**16**	**Engineering Mathematics III**	**I3611IM**	**6**	**16**
Computer Science for Engineers	**TCME3621**	**6**	**8**	**Computer Programming I**	**I3631CP**	**6**	**12**
Engineering Mechanics II	**TEGT3641**	**6**	**8**	**Engineering Mechanics II**	**I3642IM**	**6**	**8**
Statistics for Engineers	**TEGS3661**	**6**	**8**	**Statistics for Engineers**	**I3552IS**	**6**	**12**
Strength of Materials I	**TCVM3621**	**6**	**8**	**Strength of Materials I**	**I3651VM**	**6**	**12**
Fluid Mechanics	**TMEM3681**	**6**	**12**	**Fluid Mechanics 1**	**I3632NF**	**6**	**12**
Computer-Aided Drawing	**TEGT3661**	**6**	**8**	**None equivalent, to be offered again**		**6**	**8**
YEAR 2 Semester 2							
Engineering Mathematics IV	**TEGT3672**	**6**	**16**	**Engineering Mathematics IV**	**I3612IM**	**6**	**16**
Engineering Thermodynamics	**TMED3642**	**6**	**8**	**None**			
Mechanical Engineering Design I	**TMEM3642**	**6**	**8**	**Mechanical Engineering Design I**	**I3622ND**	**6**	**8**
Engineering Materials	**TMEM3622**	**6**	**8**	**Engineering Materials**	**I3661NM**	**6**	**8**
Computer Programming	**TCMS3692**	**6**	**12**	**Computer Programming II**	**I3652CP**	**6**	**12**
Electrical Machines	**TECP3622**	**6**	**8**	**Electrical Machines**	**I3652EM**	**6**	**12**
Measurements and Instrumentation	**TETA3622**	**6**	**8**	**Measurements and Instrumentation**	**I3622CM**	**6**	**8**
Industrial Attachment I	**TEGT3600**	**6**	**-**	**Workshop Practice**	**I3640IW**	**6**	**8**
HIV and the Organization	**TEGT3602**	**6**	**-**	**None -to be offered again**	**-**	**6**	**-**
YEAR 3 Semester 1							
Modelling and Analysis of Dynamic Systems	**TMEM3781**	**7**	**12**	**Control Systems**	**I3731NM**	**7**	**12**
NEW MODULES							
	YEAR 4 Semester 1						
Society and the Engineer	**TEGT3821**	**8**	**8**	**Engineering Ethics and Practice**	**I3862IP**	**8**	**8**
NEW MODULES FOR THE REST OF SEMESTERS 1 AND 2							

Bachelor of Food Science and Technology

The following table presents the summary of the modules in the old programme and new programme.

Old programme		Level	NQF credit	Equivalent Modules		Level	NQF credit
SBLG 3511	**Introduction to Biology**	**5**	**16**		**No equivalent –to be offered again**	**5**	**16**
SPHY 3501	**Physics for Life Sciences 1**	**5**	**8**	**P3511PG**	**General Physics I**	**5**	**14**
SMAT 3511	**Basic Mathematics**	**5**	**16**		**No equivalent –to be offered again**	**5**	**16**
SCHM 3532	**Chemistry for Life Sciences**	**5**	**16**		**No equivalent –to be offered again**	**5**	**16**
SPHY 3532	**Physics for Life Sciences II**	**5**	**16**	**S3512PG**	**General Physics II**	**5**	**14**
SBLG 3512	**Diversity of Life**	**5**	**16**	**S3512ED**	**Diversity of Life**	**5**	**16**
SMAT 3512	**Pre-calculus**	**5**	**16**		**No equivalent –to be offered again**	**5**	**16**
AAEC 3681	**Principles of Microeconomics**	**6**	**12**	**F3611AE**	**Principles of Economics**	**6**	**14**
AAEC 3691	**Rural Sociology**	**6**	**12**	**F3631ES**	**Community Development and Rural Sociology**	**6**	**14**
ACRS 3681	**Biostatistics**	**6**	**12**		**No equivalent –to be offered again**		
AASC 3681	**Genetics**	**6**	**12**		**No equivalent –to be offered again**	**6**	**12**
AFST 3681	**General Microbiology**	**6**	**12**	**F3611SG**	**General Microbiology**	**6**	**15**
AFST 3691	**Postharvest Technology**	**6**	**12**	**F3601SP**	**Postharvest**	**6**	**7**
AFST 3601	**Human Nutrition**	**6**	**8**		**No equivalent –to be offered again**	**6**	**8**
AASC 3612	**Biochemistry**	**6**	**16**	**F3611AB**	**Biochemistry**	**6**	**16**
AFST 3682	**Fruits and Veg. Technology**	**6**	**12**	**F3711SF**	**Fruits and Veg. Technology**	**7**	**17**
AASC 3602	**Livestock Prod. Systems**	**6**	**8**		**No equivalent –to be offered again**		
AFST 3602	**Food Technology**	**6**	**8**		**No equivalent –to be offered again**	**6**	**8**
AFST 3692	**Food Biotechnology**	**7**	**12**	**F3701SB**	**Food Biotechnology**	**7**	**8**
AACA 3701	**Field Attachment I**	**7**	**8**	**W3710SW**	**Workplace attachment**	**7**	**24**
AFST 3781	**Food Chemistry**	**7**	**12**	**F3711SC**	**Food Chemistry**	**7**	**17**
AFST 3791	**Food Microbiology**	**7**	**12**	**F3701SM**	**Food Microbiology**	**7**	**8**
AFST 3701	**Product Development and Sensory Evaluation.**	**7**	**8**	**F3702SP**	**Product Development**	**7**	**9**
AFSC 3791	**Food Processing Technology**	**7**	**12**		**Non-equivalent –to be offered again**	**6**	**8**
AFSC 3781	**Meat Science and Technology**	**7**	**12**		**No equivalent –to be offered again**	**7**	**12**
ACSC 3792	**Research Methods**	**7**	**12**	**F3712CB**	**Biometry**	**7**	**16**
AFST 3702	**Food Toxicology**	**7**	**8**	**F3811ST**	**Food Toxicology**	**8**	**19**
AFST 3722	**Food Analysis and Instrumentation**	**7**	**8**	**F3712SS**	**Food and Sensory Analysis**	**7**	**17**
AAEC 3702	**Entrepreneurship**	**7**	**8**	**F3811SE**	**Food Entrepreneurship and Management**	**8**	**18**
AFSC 3782	**Principles of Food Engineering**	**7**	**12**	**F3702SE**	**Food Engineering II**	**7**	**9**
AAEC 3782	**Agricultural Marketing**	**7**	**12**	**F3732EA**	**Agricultural Marketing**	**7**	**16**

AFST 3810	**Research Projects**	**8**	**16**	**F3883SR**	**Research project**	**8**	**8**
AACA 3801	**Field Attachment II**	**8**	**8**		**No equivalent –to be offered again**	**8**	**8**
AFST 3841	**Quality Management Systems**	**8**	**8**	**F3801SQ**	**Quality Management Systems**	**8**	**9**
AFST 3881	**Dairy Science and Technology**	**8**	**12**		**No equivalent –to be offered again**	**8**	**12**
AFST 3891	**Applied Food Engineering**	**8**	**12**		**No equivalent –to be offered again**	**8**	**12**
AFST 3861	**Food Packaging, Storage and Distribution**	**8**	**8**		**No equivalent –to be offered again**	**8**	**8**
AFST 3810	**Research Projects**	**8**	**16**	**F3883SR**	**Research Project**	**8**	**8**
AFST 3862	**Sea foods Technology**	**8**	**8**		**No equivalent –to be offered again**	**8**	**8**
AFST 3882	**Cereal Science and Technology**	**8**	**12**	**F3812SG**	**Grains and Cereals Processing**	**8**	**19**
AFSC 3802	**Edible Fats and Oils Technology**	**8**	**8**	**F3812SO**	**Oil seeds Processing Technology**	**8**	**19**
AFST 3822	**Plant Equipment and Management**	**8**	**8**		**No equivalent –to be offered again**	**8**	**8**
AAEA 3882	**Agric. Business Management**	**8**	**12**		**No equivalent –to be offered again**	**8**	**8**

Bachelor of Science in Fisheries and Ocean Sciences

Old modules	NQF Level	Credit	Equivalents	NQF Level	Credit
SBLG 3511: Introduction to Biology	**5**	**16**	**None -to be offered again**	**5**	**16**
SPHY 3501: Physics for Life Sciences I	**5**	**8**	**P3511PG: General Physics I**	**5**	**14**
SMAT 3511: Basic Mathematics	**5**	**16**	**F3531CA: Mathematics for Agriculture**	**5**	**12**
SCHM 3532: Chemistry for Life Sciences	**5**	**16**	**None -to be offered again**	**5**	**16**
SBLG 3512: Diversity of Life	**5**	**16**	**F3511OL: Introduction to Aquatic Life**	**5**	**13**
SMAT 3512: Pre-calculus	**5**	**16**	**None -to be offered again**	**5**	**16**
AAEC 3681: Principles of Microeconomics	**6**	**12**	**None -to be offered again**	**6**	**12**
AAEC 3691: Rural Sociology	**6**	**12**	**F3751OE: Fisheries and Aquaculture Extension**	**7**	**16**
AASC 3681: Genetics	**6**	**12**	**F3631OG: Genetics for Aquatic Resources**	**6**	**14**
AFST 3681: General Microbiology	**6**	**12**	**F3611SG: General Microbiology**	**6**	**15**
AAEC 3682: Production Economics	**6**	**12**	**F3631EP: Production Economics**	**6**	**14**
AFAS 3682: Introduction to Aquaculture	**6**	**12**	**F3632OQ: Aquaculture**	**6**	**14**
AACA 3701: Field Attachment I	**7**	**8**	**W3750OT: Field Attachment**	**7**	**24**
AFAP 3781: Physical Oceanography	**7**	**12**	**None -to be offered again**	**7**	**12**
AFAS 3781: Aquaculture and Fisheries products	**7**	**12**	**None -to be offered again**	**7**	**12**
AFAS 3791: Fisheries Management I	**7**	**12**	**F3751OM: Fisheries Management**	**7**	**16**
AAEC 3781: Farm Planning and Management	**7**	**12**	**None -to be offered again**	**7**	**12**
AFAS 3782: Basic Aquaculture Engineering	**7**	**12**	**None -to be offered again**	**7**	**12**
AFAS 3792: Fisheries Management II	**7**	**12**	**None -to be offered again**	**7**	**12**

AFAS 3712: Integrated Coastal Zone Management	**7**	**16**	**None -to be offered again**	**7**	**16**
AFAA 3782: Aquaculture Nutrition and Feed Manufacturing	**7**	**12**	**None -to be offered again**	**7**	**12**
ACSC 3792: Research Methods	**7**	**12**	**None -to be offered again**	**7**	**12**
AFAS 3810: Research Project	**8**	**16**	**None -to be offered again**	**7**	**16**
AFAS 3811: Biological Oceanography	**8**	**16**	**Biological Oceanography**	**7**	**16**
AACA 3801: Field Attachment II	**8**	**8**	**None -to be offered again**	**8**	**8**
AFAS 3891: Fisheries Economics	**8**	**12**	**None -to be offered again**	**8**	**12**
AFAS 3831: Fish Pathology	**8**	**16**	**None -to be offered again**	**8**	**16**
AENE 3882: Environmental Impact Assessment	**8**	**12**	**None -to be offered again**	**8**	**12**
AFAS 3812: Fish Population Dynamics	**8**	**16**	**None -to be offered again**	**8**	**16**
AFAS 3832: Aquaculture Management	**8**	**16**	**None -to be offered again**	**8**	**16**

APPENDIX 2: ARTICULATION OF THE NEW DIPLOMA CURRICULUM INTO THE DEGREE PROGRAMME

Articulation				
BSc. Crop Production Programme		Exemption	Diploma courses for exemption	
Course code	Title		Course code	Title
Year 1			Year 1	
Core Semester			Core Semester	
U2583AL	**Academic Literacy IA**	**Exemption through**	**U2583AL**	**Academic Literacy IA**
F3520ZP	**Basic Programming with Python**	**Exemption through**	**F3520ZP**	**Basic Programming with Python**
U3583DD	**Digital Literacy**	**Exemption through**	**U3583DD**	**Digital Literacy**
F3500Z1	**Issues in Agriculture**	**Exemption through**	**F3500Z1**	**Issues in Agriculture**
TBC	**Skills Portfolio**	**Exemption through**	**TBC**	**Skills Portfolio**
Semester 1			Semester 1	
F3511CP	**Soil Science**	**Exemption through**	**F3511CP**	**Soil Science**
F3521CG	**Principles of Agronomy**	**Exemption through**	**W2600CM**	**Field Attachment**
			F2411CP	**Principles of Crop Production**
F3501CW	**Basic Weed Science**	**Exemption through**	**F2601CH**	**Crop Protection**
			F2611CK	**Crop environment interaction**
Semester 2			Semester 2	
F3532CL	**Agro-Climatology**	**Exemption through**	**F2532CL**	**Basic Agro-Climatology**
			F2421CI	**Integrated Crop Farming**
F3522CS	**Plant Science**	**Exemption through**	**F2501CC**	**Anatomy and Physiology of Crops**

			F2401CB	**Introduction to Botany**
F3502CN	**Plant Genetics**	**Exemption through**	**F2511CE**	**Introduction to Plant Genetics**
			F2632CD	**Seed Production Technology**
F3532AS	**Introduction to Statistics**	**Exemption through**	**F3532AS**	**Introduction to Statistics**
Year 2			Year 2	
Core Semester			Core Semester	
U3520LP	**Leadership Skills**		**U3520LP**	**Leadership Skills**
U3420PJ	**Project Management Skills**		**U3420PJ**	**Project Management Skills**
U3420EM	**Ethics and Morality**		**U3420EM**	**Ethics and Morality**
U3420CN	**National and Global Citizenship**		**U3420CN**	**National and Global Citizenship**
U3683LA	**Academic Literacy II**		**U3683LA**	**Academic Literacy II**
F3600ZP	**Introduction to Statistical Programming with R**		**F3600ZP**	**Introduction to Statistical Programming with R**
Semester 1			Semester 1	
F3552CM	**Plant Propagation and Nursery Management**	**Exemption through**	**F2431CO**	**Olericulture Technology**
			F2412CG	**Fruit Production Technology**
Semester 2			Semester 2	
F3612TE	**Agricultural Engineering**	**Exemption through**	**F2612TF**	**Farm Power & Machinery**
			F2422TI	**Irrigation Technology**
			F2602TP	**Post-Harvesting Technology**

PROGRAMMES OFFERED UNDER THE OLD CURRICULUM

DIPLOMA IN AGRICULTURE (Ogongo Campus) [17HDAG]

PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
ULEG 2410	English for General Communication	4	16	C	
UCLC 3509	Computer Literacy	5	8	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
AAEC 2411	Mathematics and Basic Statistics	4	16	C	
AASC 2431	Biology	4	16	C	
AACA 2400	Farm Duties I	4	8	C	
Total Credits Semester 1				72	
Year 1 Semester 2					
ULEG 2410	English for General Communication	4	16	C	
AAEC 2482	Basic Economics	4	12	C	
AASC 2432	Physical Science	4	16	C	
AASC 2422	Animal Anatomy, Physiology and Reproduction	4	8	C	
AACA 2400	Farm Duties I	4	8	C	
Total credits Semester 2				60	
Total CREDITS YEAR 1				132	

Year 2 Semester 1					
AAEC 2541	Communication and Information systems	5	8	C	None
AAEC 2501	Financial Management	5	8	C	None
AAEC 2521	Introduction to Rural Sociology	5	8	C	None
ACSC 2581	Soil Science	5	12	C	None
AASC 2551	Applied Animal Health	5	16	C	None
AACA 2500	Farm Duties II	5	8	C	None
Total credits Semester 1				60	
Year 2 Semester 2					
ACSC 2582	Introduction to Research	5	12	C	AAEC 2411 (Mathematics & Basic Statistics)
ACSC 2522	Workshop technology, surveying and farm structures	5	8	C	AAEC 2411 Basic Math & Stats
ACSC 2532	Vegetable and Fruit Production	5	16	C	None
ACSC 2592	Crop Production	5	12	C	None
AASC 2502	Applied Animal Breeding	5	8	C	None
AACA 2500	Farm Duties II	5	8	C	None
Total credits Semester 2				64	
TOTAL CREDITS YEAR 2				124	

Year 3 Semester 1					
AACA 2600	Special Study	6	8	C	ACSC2582 (Introduction to Research
AACA 2601	Field Attachment	6	8	C	None
AAEC 2641	Principles of Agricultural Extension	6	8	C	None
AAEC 2661	Agricultural Marketing and Policy	6	8	C	None
AASC 2681	Intensive Animal Production	6	12	C	None

ACSC 2601	Water Management and Soil Conservation	6	8	C	ACSC 2581 (Soil Science)
AASC 2691	Range Management	6	12	C	None
Total Credits Semester 1			68		
Year 3 Semester 2					
AACA 2600	Special Study	6	8	C	ACSC2582 (Introduction to Research)
AAEC 2602	Project Management	6	8	C	None
AAEC 2622	Entrepreneurship	6	8	C	None
AASC 2622	Animal nutrition and Feeding	6	8	C	None
AASC 2602	Game Farming	6	8	C	None
AASC 2642	Extensive Animal Production	6	8	C	None
ACSC 2682	Farm Power and Machinery	6	12	C	AAEC 2411 (Basic Mathematics & Statistics)
ACSC 2622	Crop Protection	6	8	C	None
Total Credits Semester 2			68		
TOTAL CREDITS YEAR 3			132		
TOTAL PROGRAMME CREDITS			388		

MODULE DESCRIPTORS

FIRST YEAR MODULES

ULEG 2410: ENGLISH FOR GENERAL COMMUNICATION

Module title: ENGLISH FOR GENERAL COMMUNICATION
Code: ULEG 2410
NQF Level: 4
Contact hours: 4 hours per week for 28 weeks
Credits: 32
Module Assessment: Continuous Assessment (60%): 4 reading tests, 4 writing tests, 2 oral presentations, 1 literature worksheet. Examination (40%): 1x3 hour paper
Pre-requisites: None

Module Content:
This module attempts to assist students to improve their general English proficiency. The main goal of this module is, therefore, to develop the reading, writing, listening, speaking and study skills of students in order for them to perform tasks in an academic environment. This module focuses on the skills students need to perform cognitive academic tasks in an academic environment and beyond.

CLC3509: COMPUTER LITERACY

Module title: COMPUTER LITERACY
Code: CLC3509
NQF level: 5
Contact hours: 1 lecture theory and 1 lecture practical per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: 2 Practical Tests 50%, 2 Theory Tests 50%
Prerequisites: University Entry

Module Content:
The aim of this module is to equip the students through hands-on experience with the necessary skills to use application software: word processing, spreadsheets, databases, presentations and communications. The objective is to increase student's productivity in both the education and later, the work environment. The module covers the following topics. Introduction to Computers: hardware and software, types and categories of computers, usage of Computer devices and peripherals. Working with the windows operating system: File Management, working with multiple programs, using the recycle bin. Using a word processor: formatting a text and documents, spelling check, grammar and thesaurus tools, inserting tables, auto-shapes, clip arts, charts, and mail merge. Spreadsheet: worksheets and workbooks, ranges, formulas and functions, creating graphs, charts, and printing the workbook.
Databases: creating tables, relationships, queries, forms and reports. Presentation software: slide layout and master, animations, auto-content wizard and templates. Communication tools: introduction to the Internet, web browsers, search engines, downloading and uploading files, creating and sending messages, email etiquette, internet security, and digital signatures.

CSI3580: CONTEMPORARY SOCIAL ISSUES

Module Title: CONTEMPORARY SOCIAL ISSUES
Code CSI 3580
NQF Level 5
NQF Credits 8
Contact hours Equivalent to 1 hour per week for 2 semesters (Online)
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 1&2

Module Content:
The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation.

AAEC 2411: MATHEMATICS AND BASIC STATISTICS

Module Title: MATHEMATICS AND BASIC STATISTICS
Code: AAEC 2411
NQF Level: 4
NQF Credits: 16
Assessment Strategies: Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper).
Contact hours 4 hours lectures per week; 3 hours tutorials alternate week for 14 weeks
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 1

Module Content:
Numbers; Operations; Percentages; Conversion of fractions and decimals; Ratio; Rate; Proportion and scale; Algebraic representation and formulae; Equations; Indices; Measurements and conversion of units; Geometrical terms and relationships; Bearings; Tables and graphs in practical situations; Trigonometry; Basic statistics: Population and sampling; Probability sampling methods; Measures of central tendencies; Measures of dispersion: Frequency distribution (grouped and ungrouped) data; Probabilities; Regression and correlation; Analysis of variance (ANOVA); Presentation and interpretation of statistical results and information.

AASC 2431: BIOLOGY

Module Title: BIOLOGY
Code AASC 2431
NQF Level 4
NQF Credits 16
Assessment Strategies Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)
Contact hours 4 hours per week lectures; 3 hours per week practicals for 14 weeks
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 1

Module Content:
Chemical basis of life; Introductory structure of macromolecules and their functions Prokaryotic and eukaryotic cells; Overview of the five major kingdoms of organisms and Viruses; Basic plant and animal anatomy and physiology: Differences between plant and animal cells; Photosynthesis; Osmosis & diffusion, cell respiration, passive and active transport; Basic taxonomy, Basic concepts of Mendelian genetics: Cell cycle; Mitosis and Meiosis; Sexual and asexual reproduction; Introduction to ecology, ecosystems and communities; Naming of ecosystems and communities; Food chain and food web; Interrelationships among organisms.

AACA 2400: FARM DUTIES I

Module Title: FARM DUTIES I
Code AACA 2400
NQF Level 4
NQF Credits 16
Assessment Strategies Pass or fail grade. Pass with more than 80 % attendance
Contact hours one full day (7 hour day) alternating for 28 weeks
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 1&2

Module Content:

During the first year, all Diploma students will undertake one full day (7 teaching hours) of farm duties every second week, for a total of 14 days during the year. These duties will be undertaken on campus farms at Ogongo, involving all activities undertaken at the two farms. The farm duties will be geared toward developing students' specific farming skills as tractor driving and implement operation, vehicle driving, artificial insemination and pregnancy diagnosis, pump and borehole maintenance, vegetable propagation methods, keeping computerization and analysis of farm and financial records, animal judging, fertilization and pesticide application, erosion and draft animal utilization. Forty-nine teaching hours per semester will be awarded for this work. Assessment will be based on attendance at duty stations, participating in and completion of tasks and attitudes towards work, as well as grading during specific courses that take place in the recess periods (e.g. Easter and, winter and spring).

AAEC2482: BASIC ECONOMICS

Module Title:	BASIC ECONOMICS
Code	AAEC2482
NQF Level	4
NQF Credits	12
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper
Contact hours	3 hours lectures and 2 hours practical per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Definition and scope of economics and agricultural economics; Micro- and macro-economics; Economic systems; Factors influencing demand and supply of agricultural commodities; Elasticity of demand and supply; Price determination under different market structures; Production functions; Cost concepts; Optimal level of output and input use; Risk and uncertainty; Tools used in macroeconomic analysis: the theory, measurement, and determination of national income; taxation; employment and business cycles; the multiplier; fiscal policy, budget deficits, and the national debt; aggregate supply and aggregate demand; money, banking, and monetary policy; exchange rates and balance of payments accounts; and stabilization policy for unemployment and inflation, introduction to international trade and comparative advantage.

AASC 2432: PHYSICAL SCIENCE

Module Title:	PHYSICAL SCIENCE
Code	AASC 2432
NQF Level	4
NQF Credits Assessment `	16
Contact hours	Continuous assessment 60% (minimum 2 tests and Examination 40% (1 x 3 hour paper)
Prerequisite	4 hours per week lectures; 3 hours practical for 14 weeks
Compulsory/Elective	None
Semester Offered	Compulsory

Module Content:
Laboratory safety. Physical quantities and measurements –SI. Properties of matter; Atoms, elements, molecules & compounds; The Periodic Table; Chemical formulae; Covalent and ionic compounds; non-polar and polar molecules; Molecular and formula mass; Redox reactions; Moles and Molarity; Octet rule; Electronic bonding & orbitals; Lewis structures; Chemical reactions and equations; Balancing chemical equations; Stoichiometry; Acids and bases; pH & buffers; Solutions and Solubility; Structure and properties of water; Ionisation of water; Laws of motion, force, energy, work. Kinetic theory of gases; Gas laws, pressure; Basic electricity; Voltage, current, power, conductors, insulators. Thermodynamics and heat; conduction, radiation and convection.

AASC 2422: ANIMAL ANATOMY, PHYSIOLOGY AND REPRODUCTION

Module Title:	ANIMAL ANATOMY, PHYSIOLOGY AND REPRODUCTION
Code	AASC 2422
NQF Level	4
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures per week; 3 hours practical alternate week for 14 weeks
Co-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims:	

Module Content:
This module covers the following aspects: morphology and Function of the reproductive system, circulatory, respiratory, nervous, skeletal, and urinary and digestive systems of farm animals (ruminants, mono-gastric animals, and poultry), their anatomical and functional interrelationships. Practical classes which will involve the use of carcass dissections, examination of internal organs in dead animals, and the study of laboratory models, will help in the understanding of the anatomical structures and the interrelationship between organic systems. Artificial insemination will also be coved in this Module.

SECOND YEAR

AACA 2500: FARM DUTIES II

Module Title:	FARM DUTIES II
Code	AACA 2500
NQF Level	5
NQF Credits	16
Assessment Strategies	Pass or fail grade. Pass with more than 80 % attendance
Contact hours	one full day (7 hour day) alternating for 28 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
During the second year, all Diploma students will undertake one full day (7 teaching hours) of farm duties every second week, for a total of 14 days during the year. These duties will be undertaken on campus farm Ogongo, involving all activities undertaken at the two farms. The farm duties will be geared toward developing students' specific farming skills as tractor driving and implement operation, vehicle driving, artificial insemination and pregnancy diagnosis, pump and borehole maintenance, vegetable propagation methods, keeping computerization and analysis of farm and financial records, animal judging, fertilization and pesticide application, erosion and draft animal utilization. Forty-nine teaching hours per semester will be awarded for this work. Assessment will be based on attendance at duty stations, participating in and completion of tasks and attitudes towards work, as well as grading during specific courses that take place in the recess periods (e.g. Easter and, winter and Spring).

AAEC 2541: COMMUNICATION AND INFORMATION SYSTEMS

Module Title:	COMMUNICATION AND INFORMATION SYSTEMS
Code	AAEC 2541
NQF Level	5
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 lecture hour per week and practical 2 hours alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Definition of concepts, Theory of communication; the nature and importance of communication; Source, Message Channel and Receiver (SMCRE) communication models; communication process; verbal and non-verbal modes communication; written communication: writing informative articles and pamphlets for farmers; communication methods; extension campaigns; organization of agriculture show; and farmers day; Oral communication: effective speaking; presentation and use of common types of audio visual aids ; Application of ICTs in agricultural development, Design and production of communication materials. Information sourcing; scientific writing, referencing and plagiarism; Managing conflict and negotiation skills

AAEC 2501: FINANCIAL MANAGEMENT

Module Title:	FINANCIAL MANAGEMENT
Code	AAEC 2501
NQF Level	5
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Principles of financial Management; Budgeting and Record keeping; Risk management; Investment Analysis; Depreciation and Asset valuation; Financial Statements Analysis, Leasing and renting of equipment or assets; Income tax and Estate planning and legal aspects of borrowing and sources and terms of agricultural loans.

AAEC 2521: INTRODUCTION TO RURAL SOCIOLOGY

Module Title:	INTRODUCTION TO RURAL SOCIOLOGY
Course Code	AAEC 2521
NQF Level	5
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 1

Module Content:
Concepts of sociology and anthropology; the role of rural sociology in development; types of Communities; leadership structure; community based organisation (CBO); nongovernmental organisations (NGO); the social institution of communities; culture relativism; rural leadership, social change and rural development, indigenous knowledge ; rural poverty and wealth ranking; characteristic of rural and urban communities ; rural urban migration and implication for rural development; gender roles and property right in agriculture ; Impact of HIV/AIDS on Agriculture development.

ACSC 2581: SOIL SCIENCE

Module Title:	SOIL SCIENCE
Code	ACSC 2581
NQF Level	5
NQF Credits	12
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	3 hours lectures per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Aims:
This module aims to develop the student's understanding of soil as a medium for plant growth.

Module Content:
Definition and importance of soil: mineral fraction, organic matter, soil water and air. Soil formation: types of rocks; processes of weathering. Soil physical and chemical properties: texture, density, porosity, soil aeration and temperature, structure, compaction, profile, water holding capacity, cation exchange capacity. Soil nutrients for plant growth: nutrient content and nutrient availability. Fertilizers: organic and inorganic. Soil water: movement and availability. Soil conditions: acidity, alkalinity, salinity. Soil types of Namibia. Agro-ecological zones of Namibia.

AASC 2551: APPLIED ANIMAL HEALTH

Module Title:	APPLIED ANIMAL HEALTH
Code	AASC 2551
NQF Level	5
NQF Credits	16
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)
Contact hours	4 lectures per week; 3 hours practical's for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Concepts of health and disease. Disease development and body response in livestock. Introduction to Bacteriology, Virology, Parasitology, Toxicology, Pharmacology and Epidemiology of Disease. Notifiable diseases coursed by bacteria, viruses, fungi and yeast. Congenital and environmental induced defects. Important economic and zoonotic diseases of domestic animals. Common diseases of cattle, sheep, goats, pigs and poultry in Namibia. Actual activities pertaining to animal health (Restraint of animals, clinical examination, specimen collection, hygiene and sanitation) as performed by veterinarian and technicians on the farm as well as manipulating laboratory techniques necessary for diagnosing diseases of domestic animals.

ACSC 2582: INTRODUCTION TO RESEARCH

Module Title:	INTRODUCTION TO RESEARCH
Code	ACSC 2582
NQF Level	5
NQF Credits	12
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	3 hours lectures per week; 3 hours practical's/tutorials alternate week for 14 weeks
Prerequisite	AAEC 2411 Mathematics and Basic Statistics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Research process: research problem formulation, research objectives, hypothesis formulation, literature review, research methods. Work plans and budgets. Basic statistical concepts: means, mode, median, standard deviations, coefficient of variation. Basic experimental designs: completely randomized, randomized complete block. Social Survey methods and planning and design of surveys and sampling (Simple random sample, cluster, multi-stage, and stratified); Questionnaire design, interview schedule, Organization of field work for social research work. Data collection methods, Individual/group Interviews.

ACSC 2522: WORKSHOP TECHNOLOGY, SURVEYING AND FARM STRUCTURES

Module Title:	WORKSHOP TECHNOLOGY, SURVEYING AND FARM STRUCTURES
Code	ACSC 2522
NQF Level	5
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures per week; 3 hours practical alternate week for 14 weeks
Prerequisite	AAEC 2411 Mathematics and Basic Statistics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Workshop safety, workshop materials, technical drawing. Workshop equipment. Joining and assembly of metal and nonmetals. Measurements. Types of surveys: baseline, basic, triangulation, planimeter. Area/Volume measurements; Instruments, procedures, booking method. Leveling methods: Longitudinal sections, contour grid. Positioning and orientation systems: geographical positioning system, gyroscope, prismatic, traverses. Farmstead planning. Plans and drawings. Construction materials. Building procedures and equipment. Structures for specific purposes: farmstead, livestock, crop storage, greenhouses. Building economics and standards: bills of quantities.

ACSC 2532: VEGETABLE AND FRUIT PRODUCTION

Module Title:	VEGETABLE AND FRUIT PRODUCTION
Code	ACSC 2532
NQF Level	5
NQF Credits	16
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)
Contact hours	4 hours lectures per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Importance of vegetables and fruits. Types of vegetables: leafy, root, fruit vegetables and mushrooms; legumes, runner crops; exotic/indigenous vegetables. Environmental requirements, selection of suitable cultivars, establishment/vegetable nursery practices, management practices. Methods of weed, pest and disease control, harvesting and handling. Mushrooms: spawn production, vegetative growth and requirements, fruit body formation and requirements. Fruit tree nursery technology: soil sterilization and propagation methods. Major tropical and subtropical fruit species, indigenous fruit trees species and nuts: citrus, mangoes, pawpaw, grapes, peaches, figs, dates, guava, marula and macadamia nuts. Soil and climatic requirements, establishment, management practices. Harvesting, post-harvest cycle and post-harvest technology.

ACSC 2592: CROP PRODUCTION

Module Title:	CROP PRODUCTION
Code	ACSC 2592
NQF Level	5
NQF Credits	12
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment) Examination 40% (1 x 2 hour paper)
Contact hours	3 hours lecture per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Crop environment in Namibia. Cropping systems, tillage and crop establishment. Fertilization and management practices. Choice of land for different crops. Environmental factors affecting crop choice: temperature, rainfall, solar radiation, photoperiodism. Time of planting; pre- and post-rain planting. Land preparation: aims, tillage systems conventional, minimum, conservation tillage. Review of tillage and cultivation equipment for large-scale and small-scale farmers. Seeding: factors affecting seed quality, seeding depth, seeding rate, plant population. Fertilizer application times and methods. Calculation of row and intra-row spacing and fertilizer rates. Cultural practices for weed control. Harvesting: physiological maturity and harvest maturity, harvest index. Cropping systems— monoculture, mixed culture and intercropping. Soil requirements, climatic requirements and management practice for cereals; legumes, fibre crops, oil seed crops, root and tuber crops.

AASC 2502: APPLIED ANIMAL BREEDING

Module Title:	APPLIED ANIMAL BREEDING
Code	AASC 2502
NQF Level	5
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 lecture per week; 3 hours practicals alternate week for 14 weeks

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Applications of population and quantitative genetics principles to the improvement of livestock and poultry. Principles of gene segregation and analysis. Concepts in population genetics including change in gene frequencies as the basis for livestock improvement by selection, Hardy-Weinberg equilibrium, forces that change gene frequencies are discussed. The module covers: Mendelian genetics; causes of variation, measures of variation, partitioning of variation into its causes; estimation of heritability; genotype x environment interactions; correlations between traits; principles of selection; genetic relationships. The practical application of the principles of selection are discussed emphasizing livestock performance recording and evaluation, methods of breed improvement by selection and utilization of different mating systems in beef cattle, dairy cattle, swine, sheep and goats. Breeding values and their application in industry breeding

THIRD YEAR

AACA 2600: SPECIAL STUDY

Module Title:	SPECIAL STUDY
Code	AACA 2600
NQF Level	6
NQF Credits	16
Contact hours	32
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
Students carry out a supervised study of a current topic in Agriculture and related fields. The course includes participation in meetings organized by the coordinator, work with a faculty advisor to develop a study, formulate hypotheses, design and carry out experiments and collect data and write a report. Students will make a presentation to other students of the research proposal and a final presentation of the results.

AACA 2601: FIELD ATTACHMENT

Module Title:	FIELD ATTACHMENT
Code	AACA 2601
NQF Level	6
Assessment Strategies	Assessment will consist of on-site inspection, a report by the field supervisor and a written report and oral presentation by the student.
Notional Hours	80
Contact hours	6 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Three periods of , in total, six (6) weeks of field attachment will be undertaken by all Diploma students in one summer recess period (two are available: between the 1st and 2nd year and again between 2nd and 3rd year) and the winter recess in the 2nd year to gain practical experience and hands-on skills in support of teaching. During these periods, the students will be attached to suitable community forests, research stations, extension units and agro-industries in a structured, pre-planned manner to ensure that the objectives of off-site training are attained. Students will be visited during their attachment on-site to check on the efficiency of attachment. Twenty-one lecture hours (2 credits at level 5) will be allocated to this course for oral presentations.

AAEC 2641: PRINCIPLES OF AGRICULTURAL EXTENSION

Module Title:	PRINCIPLES OF AGRICULTURAL EXTENSION
Code	AAEC 2641
NQF Level	6
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures and 2 hr practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Definition of extension and history of extension; role of agriculture extension worker; extension methods and nature of extension and development; the concept of adult learning; adoption and diffusion theory; opinion leaders and contact farmers; agricultural extension system and approaches: FSRE; group dynamics; establishing and strengthening farmer organisations and formation of new groups; Participatory Rural Appraisal (PRA) techniques; Theoretical perspective in extension program

development, purpose and steps in planning process; Agriculture extension campaigns; Motivation theory (Maslow's Hierarchy of needs) plan of work coordination supervision and administration feedback and evaluation procedure.

AAEC 2661: AGRICULTURAL MARKETING AND POLICY

Module Title:	AGRICULTURAL MARKETING AND POLICY
Code NQF Level NQF	AAEC 2661
Credits Assessment	6
Strategies	8
Continuous assessment	60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 lectures per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Aims:

The course introduces students to concepts and theory in agricultural marketing as well as marketing plans of agricultural commodities and the essentials trade and contemporary policy issues critical to economic performance and growth in today's dynamic and competitive environment.

Introduction to marketing, marketing functions and systems, marketing agricultural products, determining prices of agricultural products, demand and supply elasticities of agricultural commodities, price fluctuations, marketing margins, marketing alternatives (auctions, commodity exchanges, future and contract markets) and strategies, market structures, supply chain analysis (supply and demand chain, vertical and horizontal integration) of key agricultural commodities in Namibia. Introduction to policy formulation and analysis, the National Agricultural Policy, credit policy, input policy, environmental policy, food security policy.

AASC 2681: INTENSIVE ANIMAL PRODUCTION

Module Title:	INTENSIVE ANIMAL PRODUCTION
Code	AASC 2681
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous Assessment: 60 % (2x assignments + 2 tests + at least 5 marked practicals); Exam: 40% (1 x 2 hr paper)
Contact hours	03 Lecturers hours / week for 14 weeks; 03 Practical hours / weeks alternating
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Aims:

This course develops the students' understanding of pig, dairy and poultry production transportation and animal welfare. Pig slaughter and product quality, Processing, preservation and storage of animal products. The Namibian dairy industry. Breeds of dairy cattle & production systems. The production cycle and management of dairy cattle. Processing, preservation and storage of dairy products. Poultry production in Namibia; Poultry breeds & production systems; Poultry management. Marketing, transportation and animal welfare, Chicken slaughter and product quality, Processing, preservation and storage of animal products.

ACSC 2601: WATER MANAGEMENT AND SOIL CONSERVATION

Module Title:	WATER MANAGEMENT AND SOIL CONSERVATION
Code	ACSC 2601
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 lectures per week, 3 hours practical alternate weeks for 14 weeks
Prerequisite	ACSC 2581 Soil Science
Compulsory/Elective	Compulsory
Semester Offered	1

Module Aims:

This course develops a student's understanding of irrigation crop water requirements and the process of soil erosion.

Module content:

The hydrological cycle, water sources and quality, uses and requirements. Water harvesting and storage. Soil erosion and soil loss estimation. Wind erosion and control. Conservation agriculture. Social, economic and institutional factors in water management and soil conservation planning. Overview or irrigation in Namibia. Soil/plant/water relationships. Crop water requirements. Irrigation methods. Drainage of agricultural lands.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

AASC 2691: RANGE MANAGEMENT

Module Title:	RANGE MANAGEMENT
Code	AASC 2691
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous Assessment: 60% (2x assignments + 2 tests + at least 5 marked practicals); Exam: 40% (1 x2 hr paper)

Contact hours	3 lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Roles, basic terminologies & background information on rangelands; Namibian range types. Overview of the carrying capacity of Namibian range types and carrying capacity determination. Morphology and taxonomy of common range plants. Growth cycle of plants and plant & seed dormancy. Types of succession including pioneer, sub-climax and climax processes; Retrogression and die-back rate of selected range plants; Factors influencing succession; State & transition models. Animal-plant interactions on range. Plant adaptation to herbivory; Grazing systems & stocking rates. Continuous and rotational grazing. Range degradation: Bush encroachment, overgrazing, desertification and erosion. Range evaluation and monitoring; Range condition & trend assessment; integrated feed budgeting and fodder flow planning; introduction to cultivated pastures; conservation of forage: hay and silage, in situ conservation.

AAEC 2602: PROJECT MANAGEMENT

Module Title:	PROJECT MANAGEMENT
Code	AAEC 2602
NQF Level	5
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours of lectures per week and 2 hour practical alternate week 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Project as a means of developing rural areas. The project cycle; project identification, situation analysis: problem tree analysis. Project review (technical, institutional and managerial); Project environment: social, political, financial economic, commercial, legal and gender. Project design techniques (logical framework); Project implementation, management structure and resources; Project monitoring; project evaluation, type of evaluation. Examples of projects, Namibian projects, level of planning. Projects in the context of the regional and national development plan.

AASC 2622: ANIMAL NUTRITION AND FEEDING

Module Title:	ANIMAL NUTRITION AND FEEDING
Code	AASC 2622
NQF Level	6
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures per week; 3 hours practicals alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:
The chemical composition of feeds. The biochemistry of nutrients (carbohydrates, lipids, proteins, vitamins and micro- and macro-minerals), anti-nutrients and water. Nutrient standards (voluntary feed intake, crude protein, digestibility, metabolizable energy) and the nutrient requirement of animals. Feeds and feedstuffs (roughage, concentrates, supplements, feed additives, growth promotants and performance manipulants). Comparative digestion of feeds and absorption (diffusion & facilitated) of nutrients in ruminants and non-ruminants. Mineral and Vitamin Nutrition. On-farm processing of feeds. Feed formulation. Metabolic disorders.

AAEC 2622: ENTREPRENEURSHIP

Module Title:	ENTREPRENEURSHIP
Code	AAEC 2622
NQF Level	6
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures and 2 hrs practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:
Management function; types of business organization. Human resource management in SMEs: labour requirement, recruitment, selection and induction, compensation and incentives, labour relations, dismissal and compliance with Labour Act; Entrepreneurship; Strategic management dimensions, strategy levels, decisions, risks and benefits; Strategic plan; The SWOT analysis, business environment, formulation of objectives and strategies, development of action plans and functional tactics and strategic control; components of feasibility study and business plan.

AASC 2602: GAME FARMING

Module Title:	GAME FARMING
Code	6
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours per week lectures; 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:
Potentials and constraints of game ranching in Namibia. Identification, ecology and management of suitable game species in Namibia. Management of the game ranch. Wildlife ethology and its implication to wildlife management. Wildlife surveys. Wildlife management in conservancies, community forests and other land uses types. Future prospects of each land use. Human and wildlife conflicts: the concept, management of conflict, existing policies and regulations on human wildlife conflicts. Game population dynamics. Environment, production, financial and marketing management. Product diversity and quality control.

AASC 2642: EXTENSIVE ANIMAL PRODUCTION

Module Title:	EXTENSIVE ANIMAL PRODUCTION
Code	AASC 2642
NQF Level	6
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures; 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:
Characteristics, requirements and constraints of extensive meat production systems in Namibia. Production systems. Breeds of beef cattle, mutton sheep and goats. Facilities and handling. Management: sexual activity and fertility, flock composition, management targets and calendar, herd health, diversification. Economics of and factors affecting extensive meat production in Namibia, including legal framework. Record keeping. Growth and development of muscle, fat and connective tissue. Muscle physiology and composition. Conversion of muscle to meat during slaughtering and processing. Meat quality and legal framework. Bio-security. Consumer concerns. Future prospects of the industry.

ACSC 2682: FARM POWER AND MACHINERY

Module Title:	FARM POWER AND MACHINERY
Code	ACSC 2682
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	3 hours lecture per week; 3 hours practical alternate week for 14 weeks
Prerequisite	AAEC 2411 Mathematics and Basic Statistics
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
Animal Power in Namibia. Selection, training and maintenance of draft animals. Animal drawn implements. Internal combustion engines and maintenance. Transmission and other sub systems. Tractors operation and maintenance. Tillage: Primary secondary, conservation tillage equipment, Implement Types, their operation, calibration and maintenance Crop planting, fertilization and weed control, crop protection, harvesting and post-harvest equipment. Crop drying, storage, handling and processing equipment. Farm machinery management.

ACSC 2622: CROP PROTECTION

Module Title:	CROP PROTECTION
Code	ACSC 2622
NQF Level	6
NQF Credits	8
Assessment Strategies	Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)
Contact hours	2 hours lectures per week, 3 hours practical alternate week
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content:

Definition of pests, diseases and weeds. Pests and diseases during production and storage. Importance of crop protection. Characteristics and classification of insects, fungi, bacteria, viruses and weeds. Common fungal, bacterial and viral plant diseases of Namibia. Common weeds of Namibia. Common insect pests of Namibia. Methods of crop protection and their application. Integrated pest management. Pesticide handling and safety. Crop protection legislation in Namibia and International guidelines.

B.SC. AGRICULTURE (AGRICULTURAL ECONOMICS) HONS (17BSAE)

PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
UCLC 3509	Computer Literacy	5	8	C	
ULCE 3419	English Communication and Study Skills	4	16	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
SBLG 3511	Introduction to Biology	5	16	C	
CEMI 3571	Basic Microeconomics	5	16	C	
SMAT 3511	Basic Mathematics	5	16	C	
Total Credits Semester 1					80
Year 1 Semester 2					
CEMA 3572	Basic Macroeconomic	5	16	C	
SBLG 3512	Diversity of Life	5	16	C	
SMAT 3512	Pre-calculus	5	16	C	
SSTS 3522	Introduction to Statistics	5	8	C	
ULEA 3519	English for Academic Purposes	5	16	C	
Total credits Semester 2					72
Total CREDITS YEAR 1					152

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 2 Semester 1					
AAEI 3681	Intermediate Microeconomics	6	12	C	CEMI3571 (Basic Microeconomics)
AAEC 3691	Rural Sociology	6	12	C	None
AAEF 3681	Financial Management	6	12	C	None
AAEA 3681	Agric. Communication and Group Dynamics	6	12	C	None
ACSC 3691	Agronomy	6	12	C	None
Total Credits Semester 1					60
Year 2 Semester 2					
AAEC 3682	Production Economics	6	12	C	CEMI3571(Basic Microeconomics)
AAEI 3682	Intermediate Macroeconomics	6	12	C	CEMA3572(Basic Macroeconomics)
AAEC 3612	Mathematical Economics & Linear Programming	6	16	C	SMAT 3511 (Basic Mathematics)
AASC 3602	Livestock Production Systems	6	8	C	None
AFST 3602	Food Technology	6	8	C	None
Total credits Semester 2					60
Total CREDITS YEAR 2					120

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 3 Semester 1					
AACA 3701	Field Attachment I*	7	8	C	None
ACSE 3781	Agricultural Engineering	7	12	C	None
AAEC 3751	Econometrics	7	16	C	AAEC 3612

					(Mathematical Economics & Linear Programming)
AAER 3781	Resource Economics	7	12	C	AAEI 3681 (Intermediate Microeconomics)
AAEC 3781	Farm Planning and Management	7	12	C	None
AAED 3781	Development Economics	7	12	C	None
Total Credits Semester 1					72
Year 3 Semester 2					
AAER 3782	Research Methodology in Agric. Economics	7	12	C	None
AAEC 3712	Agricultural Extension	7	16	C	AAEC 3691 (Rural Sociology)
AAEC 3702	Entrepreneurship	7	8	C	None
ACSC 3722	Crop Storage and Handling	7	8	C	None
ACSC 3722	Agricultural Price analysis and Forecasting	7	12	C	AAEC 3731 (Econometrics)
AAEC 3782	Agricultural marketing	7	12	C	None
Total credits Semester 2					68
Total CREDITS YEAR 3					140

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 4 Semester 1					
AACA 3801	Field Attachment II	8	8	C	None
AAEC 3810	Research Project in Agricultural Economics	8	16	C	AAER3782 (Research Methodology Agricultural Economics)
AAEC 3881	Project Planning and Management	8	12	C	None
AAEC 3891	International Agricultural Trade	8	12	C	None
AASC 3881	Beef Production	8	12	C	None
Total Credits Semester 1					60
Year 4 Semester 2					
AAEC 3810	Research Project in Agricultural Economics	8	16	C	AAER3782 (Research Methodology Agricultural Economics)
AAEC 3882	Agricultural Policy Analysis	8	12	C	None
AAEA 3882	Agric. Business Management	8	12	C	None
AASC3892	Small Ruminant Production	8	12	C	None
AAEC 3842	Rural Development	8	8	C	AAEC 3712 (Agricultural Extension)
Total credits Semester 2					60
Total CREDITS YEAR 4					120
TOTAL CREDITS FOR THE PROGRAMME					532

MODULE DESCRIPTORS

FIRST YEAR

CLC3509: COMPUTER LITERACY

Module title:	COMPUTER LITERACY
Code:	CLC3509
NQF level:	5
Contact hours:	1 lecture theory and 1 lecture practical per week for 14 weeks
Credits:	8
Module assessment:	Continuous Assessment 100%: 2 Practical Tests 50%, 2 Theory Tests 50%
Prerequisites:	University Entry

Module Content:
The aim of this module is to equip the students through hands-on experience with the necessary skills to use application software: word processing, spreadsheets, databases, presentations and communications. The objective is to increase student's productivity in both the education and later, the work environment. The module covers the following topics. Introduction to Computers: hardware and software, types and categories of computers, usage of Computer devices and peripherals. Working with the windows operating system: File Management, working with multiple programs, using the recycle bin. Using a word processor: formatting a text and documents, spelling check, grammar and thesaurus tools, inserting tables, auto-shapes, clip arts, charts, and mail merge. Spreadsheet: worksheets and workbooks, ranges, formulas and functions, creating graphs, charts, and printing the workbook.
Databases: creating tables, relationships, queries, forms and reports. Presentation software: slide layout and master, animations, auto-content wizard and templates. Communication tools: introduction to the Internet, web browsers, search engines, downloading and uploading files, creating and sending messages, email etiquette, internet security, and digital signatures.

LCE3419 ENGLISH COMMUNICATION & STUDY SKILLS

Module title:	ENGLISH COMMUNICATION AND STUDY SKILLS
Code:	LCE3419
NQF Level:	4
Contact hours:	4 hours per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment (60%): two tests (reading and writing), two reading assignments, one oral presentation, Examination (40%): one three hour examination paper
Pre-requisites:	None

Module Content:
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module Title:	CONTEMPORARY SOCIAL ISSUES
Code	CSI 3580
NQF Level	5
NQF Credits	8
Contact hours	Equivalent to 1 hour per week for 2 semesters (Online)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1&2

Module Content:
The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation.
Module Descriptor (Rationale of the module): The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title	INTRODUCTION TO BIOLOGY
Code	SBLG3511
NQF Level	4
Contact hours	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
NQF Credits	16
Module Assessment:	Continuous assessment (40%): Theory (not less than 3 tests and 2 assignments), 40%. Practicals (not less than 10 marked assignment), 60%. Examination (60%): 3 hour examination paper.
Prerequisite	NSCC (Biology C or better)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
It will consider organization of life, chemical basis of life, carbohydrates, proteins, nucleic acids, lipids and fats, water, cell structure and function, prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton, membrane structure and function, cell communication, mitosis, meiosis, cell reproduction, cell cycle, and cell death. The following topics will be covered: Introduction to systems of classification, taxonomy and binomial nomenclature, including the five kingdoms and the three domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

CEMI3571: BASIC MICROECONOMICS

Module title:	BASIC MICROECONOMICS
Code:	EMI3571
NQF Level:	5
Credits:	16
Contact hours:	4 hours lecture per week for 14 weeks
Module assessment:	Continuous assessment 50%: two tests and one assignment Examination 50%: 1 x 3 hour examination paper
Pre-requisites:	None

Module Content:
Economics is the study of how society allocates scarce resources to satisfy the wants of its members for goods and service. As such, it is a subject concerned with issues of both efficiency and equity. An efficient economy gets the most it can from its scarce resources; an equitable economy fairly distributes the benefits of its resources among its members. Is the economy efficient? Is the economy fair? The course aims to introducing students to key concepts used in microeconomics and facilitate a basic understanding of the economic phenomena. The course is designed to help students understand that society's economic choices often involve trade-offs between efficiency and equity.

LEA3519: ENGLISH FOR ACADEMIC PURPOSES

Module title:	ENGLISH FOR ACADEMIC PURPOSES
Code:	LEA3519
NQF level:	5
Contact hours:	4 periods per week for 14 weeks
Credits:	16
Module	Continuous assessment (60%): 2 tests (reading and writing), 1 academic written essay, 1 oral presentation Examination (40%): One three hour examination paper
Prerequisites:	None

Module Content:
This module develops a student's understanding, and competencies regarding academic conventions such as academic reading, writing, listening and oral presentation skills for academic purposes. Students are required to produce a referenced and researched essay written in formal academic style within the context of their university studies. Students are also required to do oral presentations based on their essays. The reading component of the course deals with academic level texts. This involves students in a detailed critical analysis of such texts. The main aim is therefore, to develop academic literacy in English.

SBLG 3512: DIVERSITY OF LIFE

Module title:	DIVERSITY OF LIFE
Code:	SBLG 3512
Course Equivalent:	NSSC (/HIGH GRADE) Biology
NQF level:	5
Contact hours:	4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits:	16
Module assessment:	Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSCC (Biology C or better)

Module Content:
This module is designed to give students a detailed understanding of the diversity of life. It gives students the broader appreciation of biodiversity in the different ecological habitats. The course shall describe diagnostic characteristics of principle taxonomic categories for each phylum. Coverage of each Phylum shall follow a phylogenetic (evolutionary) approach as well as introduce broad ecological and physiological principles. Various aspects of reproduction and development shall be highlighted. This module prepares students to understand subsequent courses such as Introduction to Ecology and Microbiology, Population Ecology, Comparative physiology, Biogeography, Plant and Animal Form and Function
Topics covered will include viral, bacterial, fungal, algal, animal and plant diversity. It then considers the characteristics and life cycles of the following important algae, animal and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrrophyta, Cryptophyta, Protostomate phyla: Nemertea, Mollusca, Anellida, Arthropoda, Nematoda, Rotifera, Lophophorates, Onychophora. Deuterostomate phyla: Echinodermata, Hemichordata and Chordata (Subphyla: Urochordata, Cephalochordata and Vertebrata: Class Myxiniformes, Petromyzontiformes, Placoderms, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.
Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field.

SMAT 3512: PRE-CALCULUS

Module Title:	PRE-CALCULUS
Code:	SMAT 3512
NQF level:	5
Contact hours:	4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module Content:
Functions: one-to-one and onto functions, horizontal line test, composition of functions, inverse of a function. Introduction to exponential and logarithmic functions. Limit of a function: definition, left and right limits, infinite limits, limits at infinity, continuity in terms of limits. Differentiation: rate of change, derivative of a function, rules of differentiation, increasing and decreasing functions and graph sketching. Integration: antiderivatives, the definite integral, area under a graph. Trigonometry: further trigonometric identities, area of a sector and segment of a circle, derivatives and integrals of trigonometric functions.

SSTS 3522: INTRODUCTION TO STATISTICS

Module Title:	INTRODUCTION TO STATISTICS
Code:	SSTS 3522
NQF Level:	5
Contact Hours:	2 Lectures per Week + 1 hour tutorial per week for 14 weeks
Credits:	8
Module Assessment:	Continuous assessment (at least two tests and two assignments) 40%, Examination 60% (1x2 Hour examination paper)
Prerequisites:	C in IGCSE Mathematics

Module Content:
Definition: Statistics; descriptive, inferential. Variables: qualitative versus quantitative. Data types: primary versus secondary, categorical versus discrete, continuous. Sources of data. Population versus sample. Types of measurements: nominal, ordinal, interval, ratio scales. Presentation of data: tabular forms and graphical methods: histograms, pie charts, bar charts, frequency polygons, ogives, stem- and- leaf plots, box- and-whiskers plots. Measures of Central Tendency: Σ notation, mean, median, mode, quartiles, percentiles. Measures of Dispersion: variance, standard deviation, range, inters- quartile range, skewness and kurtosis. Identification of outliers. Uses of scientific calculators for statistical manipulation limited to calculation of mean, standard deviation.

CEMA3572: BASIC MACROECONOMICS

Module Title:	BASIC MACROECONOMICS
Code:	CEMA3572
NQF Level:	5
Credits:	16
Contact hours:	4 hours lecture per week for 14 weeks
Module assessment:	Continuous assessment 50%: two tests and one assignment Examination 50%: 1 x 3 hour examination paper
Pre-requisites:	None

Module Content:
This course introduces basic concepts and tools used in macroeconomic analysis: the theory, measurement, and determination of national income; business cycles; the multiplier; fiscal policy, budget deficits, and the national debt; aggregate supply and aggregate demand; money, banking, and monetary policy; exchange rates and balance of payments accounts; and stabilization policy for unemployment and inflation.

(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SECOND YEAR

AAEI 3681: INTERMEDIATE MICROECONOMICS

Module Title:	INTERMEDIATE MICROECONOMICS
Code	AAEI 3681
NQF Level	6
NQF Credits	12
Contact hours	3 lectures per week for 14 weeks
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Prerequisite	CEMI 3571Basic Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course aims to develop students' ability to use some fundamental tools of microeconomics analysis and to apply them to a wide range of economic problems. In particular, the analytical tools are intended to assist students in understanding and undertake research into the area of agricultural economics and agribusiness. This implies focus on firm level issues including the agency problem, consumer behavior looking at choice, preferences, budget constraints, and utility maximization, risk, cost minimization, employment and wages trade offs.

AAEC 3691: RURAL SOCIOLOGY

Module Title:	RURAL SOCIOLOGY
Code	AAEC 3691
NQF Level	6
NQF Credits	12
Contact hours	3 lectures per week for 14 weeks
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module investigates the basic sociological concepts and their application to agricultural progress and rural development planning; the significance of rural sociology to agricultural extension and rural development; differences between rural and urban population; culture and culture change, social interaction and social structures; groups and organization, deviance, social class and stratification; Social institutions families; religions; rural/urban migration and environment; social change in global perspective.

AAEF 3681: FINANCIAL MANAGEMENT

Module Title:	FINANCIAL MANAGEMENT
Code	AAEF 3681
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hour	3 lectures per week for 14 weeks; 1 practical for 1 hour alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course includes issues such as: evaluating and controlling profitability, growth, risk and liquidity in the farm and agribusiness firms, farm accounting records, credit, leverage, capital budgets, and capital costs, capital structure, land acquisition and improvements, and sources of credit and finance; farm financing practical implications (time delays in production, daily interest calculations, timeframe involved in perfection of securities proposed for a specific lending).

AAEA 3681: AGRICULTURAL COMMUNICATION AND GROUP DYNAMICS

Module Title:	AGRICULTURAL COMMUNICATION AND GROUP DYNAMICS
Code	AAEA 3681
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 2 hours alternate week for 14 weeks

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course clarify philosophies, and definition of communication; importance roles and component of communication to change agents; different communication channels and models; Audio-visual aid and public speaking; news reporting articles and newsletters; communication and perception; definition and importance of group; the group as channel of communication; ICT in agriculture (mobile phone, internet and computer usage), group formation and functioning; group techniques; the contribution of Beal, Bohlen and Raudabaugh to group dynamics; Group Norms and cohesion; group goals; Behaviour and attitude in a group; motivation of group; different leadership styles and theories;

AAEC 3682: PRODUCTION ECONOMICS

Module Title:	PRODUCTION ECONOMICS
Code	AAEC 3682
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact hours	3 lectures per week for 14 weeks and 1hour of practical/week
Prerequisite	CEMI 3571 Basic Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This module covers the basic theory of how, what and when firms should produce to maximize profits. Based on the neoclassical theory of the firm presented in most general microeconomic textbooks such as production functions, cost of production, optimum resource allocation, profit maximization, isoquants, product-product relationships, economies of size and scale, it extends the general treatment and focuses on the application of the theory to specific problems that the agricultural firm faces when making production decisions to maximize profits. Technical change is often very expensive equipment in modern production motivates the following focus areas: 1) How to optimize production under restrictions, 2) Treatment of fixed inputs and the process of input fixation, 3) Optimization of production over time, 4) Linear Programming as tools for optimization in practice. Introduce students to the concept of production decisions under risk and uncertainty.

AAEI 3682: INTERMEDIATE MACROECONOMICS

Module Title:	INTERMEDIATE MACROECONOMICS
Code	AAEI 3682
NQF Level	6
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact hours	3 lectures per week for 14 weeks
Prerequisite	CEMA 3572 Basic Macroeconomics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course includes issues such as: price indices, inflation, real and nominal values, national accounting, determination of aggregate demand and supply, consumption, investment, and savings; it also presents fiscal and monetary policies, government spending, taxation, budget deficits, interest rates, money and banking and balance of payments, employment and business cycles. It provides an overview of the position of the agriculture and fishing sectors in the national economy.

AEC 3612: MATHEMATICAL ECONOMICS AND LINEAR PROGRAMMING

Module Title:	MATHEMATICAL ECONOMICS AND LINEAR PROGRAMMING
Code	AEC 3612
NQF Level	6
NQF Credits	16
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 3 hour paper)
Contact Hours	4 lectures per week for 14 weeks;1 practical for 1 hour per week for 14 weeks
Prerequisites	SMAT 3511 Basic Mathematics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course focuses on matrix algebra, functions, differentiation, integration, simplex method and linear programming and their applications to decision making in agricultural economics and business.

THIRD YEAR

AACA 3701: FIELD ATTACHMENT I

Module Title:	FIELD ATTACHMENT I
Code	AACA 3701
NQF Level	7
NQF Credits	8
Assessment Strategies	Continuous assessment 40% (Class oral presentation); 60% (report write up.)
Contact Hours	6 weeks of Field Attachment
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
This is a practical course where students spend time at real work situations under the supervision of qualified personnel. The students are attached to suitable agricultural businesses and institutions concerned with agricultural economics and rural development and agriculture. During the attachment period University lecturers visit the students to ensure that they are doing practical work as prescribed.

AAEC 3751: ECONOMETRICS

Module Title:	ECONOMETRICS
Code	AAEC 3751
NQF Level	7
NQF Credits	16
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 3 hour paper)
Contact Hours	4 lectures per week for 14 weeks; 2 practical hours per week for 14 weeks
Co-requisite	AAEC 3612 Mathematical Economics & Linear Programming
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course includes issues such as: classical linear regression model, assumptions, model formulation, hypothesis testing, and violation of OLS assumptions, detection and correction of multicollinearlity, autocorrelation, heteroscedascity, functional forms, dummy variables, and estimation using appropriate computer software (e.g. SPSS or STATA)

AAER 3781: RESOURCE ECONOMICS

Module Title:	RESOURCE ECONOMICS
Code	AAER 3781
NQF Level	7
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 1 hour alternate week for 14 weeks
Prerequisite	AAEI 3681 Intermediate Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course include issues such as: Natural Resources classification; natural resources issues (efficient utilization, sources of inefficiency –property right, externalities, market and government failure); resource scarcity and sustainability use of natural resources, policies to address efficiency goals; natural resources analysis and valuation (introduction to Cost-Benefit analysis, use and non-use values, and resources valuation techniques –Hedonic Pricing Method, Travel Cost Method and Contingent Valuation Method); application of economics in natural resources management – renewable resources (e.g. fishery, water, forest and land) and non renewable resources (mineral, petroleum or natural gas) use/extraction.

AAEC 3781: FARM PLANNING AND MANAGEMENT

Module Title:	FARM PLANNING AND MANAGEMENT
Code	AAEC 3781
NQF Level	7
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 1.5 hour every alternate for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course includes issues such as: management of farm records; machinery; land; labor; and capital, farm business planning, enterprise budgeting, agricultural risk management strategies. Students will be exposed to business planning using spreadsheets.

AAED 3781: DEVELOPMENT ECONOMICS

Module Title:	DEVELOPMENT ECONOMICS
Code	AAED 3781
NQF Level	7
NQF Credits	12
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 1 hour alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course is an introduction to the field of development economics, focusing on some keys questions such as: why some countries poor and others rich? Why some countries experienced rapid economic development while others are trapped in poverty? It also reviews policy issues which developing countries can pursue to best address poverty and underdevelopment. These are just few of the many questions that this course will deal with. Last but not the least, the course looks at how international factors such as trade and foreign investment affect a countries economic development.
The course is divided into 3 main parts. PART I: Defining and Measuring Economic Development: the millennium development goals, human development index, measuring inequality, measuring poverty. PART II: Domestic Development Policy: Theories of economic development; human capital and development; rural-urban migration; agricultural markets and development. PART III: International Policies: Trade and development; balance of payment and debt crisis; foreign sources of finance, financial markets and government policy.

AAER 3782: RESEARCH METHODOLOGY IN AGRICULTURAL ECONOMICS

Module Title:	RESEARCH METHODOLOGY IN AGRICULTURAL ECONOMICS
Code	AAER 3782
NQF Level	7
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 1 hour per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course includes issues such as: identifying research problems, definition research problem, and formulation, data collection, data analysis, presentation and report writing.

AAEC 3712: AGRICULTURAL EXTENSION

Module Title:	AGRICULTURAL EXTENSION
Code	AAEC 3712
NQF Level	7
NQF Credits	16
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 3 hour paper)
Contact Hours	4 lectures per week for 14 weeks; 1 practical for 1 hour per week for 14 weeks
Prerequisite	AAEC 3691 Rural Sociology
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course explore Extension concepts; principles and theories; compare Modern and Traditional Extension; agricultural extension as adult learning; extension methods; definition and importance of program extension; philosophy and principles of program development in extension; Comparing agricultural extension approaches (FSRE); Science and Indigenous knowledge systems and participatory appraisal techniques ; Social change and innovation; Attributes of Innovations and their rate of adoptions; Elements in diffusion of Innovations; Motivational theories; Community participation and involvement in extension, PRA methodologies and techniques; Improving the organisation and management of extension; establishing and strengthening farmer's organisations.

AAEC 3702: ENTREPRENEURSHIP

Module Title:	ENTREPRENEURSHIP
Code	AAEC 3702
NQF Level	7
NQF Credits	8
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	2 lectures per week for 14 weeks; 1 practical for 1.5 hour alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 2

Module Content:
The course includes issues such as: types of entrepreneurs, the importance of entrepreneurship and the forces and ideas that lead to business establishment, growth and survival, choice of the option of self-employment (carrying out feasibility studies and writing business plan), entrepreneurial process, the different schools of thought on the sources of entrepreneurship, the entrepreneur's characteristics, traits and motivation; developing entrepreneurial skills (SWOT analysis, business opportunity identification, opportunity assessment and evaluation) the role of entrepreneurship in the economy: the management competencies necessary for business success (planning, organizing, coordinating, operations, directing, leading and controlling), financing a business, Government policies on small business ventures (SME).

AAEA 3782: AGRICULTURAL PRICE ANALYSIS AND FORECASTING

Module Title:	AGRICULTURAL PRICE ANALYSIS AND FORECASTING
Code	AAEA 3782
NQF Level	7
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 2 hours practicals per week for 14 weeks
Co-requisite	AAEC 3731 Econometrics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
In this module students will be exposed to role price, price determination and price discovery, using of index numbers to correct for inflation, analysis of trend (movement of prices over time), least square regression analysis for defining trends and relationship between data series, prices analysis during cycles, measuring cycles, conceptual basis for seasonality, measuring seasonality, estimation of demand and supply function, estimating price discovery models, and causality.

AAEC 3782: AGRICULTURAL MARKETING

Module Title:	AGRICULTURAL MARKETING
Code	AAEC 3782
NQF Level	7
NQF Credits	12
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact hours	3 lectures per week for 14 weeks; 1 Practical for 3 hours every alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course include issues such as: Agricultural to marketing functions; Price Analysis and the marketing functions (role of price in a competitive economy, relative prices, supply and demand analysis elasticities, price discovery etc.,); Farm and Food Prices; Risk Management and Futures Markets; Models of market behavior (derived demand, derived supply and food and marketing costs/margins; Marketing Research and Planning (SWOT analysis i.e. internal and external environment analysis, marketing mix the 4P's); Spatial characteristics of markets (including marketing constraints in developing countries); Agricultural products markets and supply chain management (supply and demand chain, vertical and horizontal integration, middlemen, agricultural cooperatives); Commodity supply chain analysis; Strategic marketing management.

FOURTH YEAR MODULES

AACA 3801: FIELD ATTACHMENT II

Module Title:	FIELD ATTACHMENT II
Code	AACA 3801
NQF Level	8
NQF Credits	8
Assessment Strategies	40% (Class oral presentation); 60% (report write up.)
Contact Hours	8 practical hours per day for 6 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
This is a practical course where students spend time at real work situations under the supervision of qualified personnel. The students are attached to suitable agricultural businesses such the Ministry of Agriculture and Forestry's Green Scheme projects, Meatboard Board of Namibia, Agronomic Board, and institutions concerned with agricultural economics and rural development and agriculture such as the Agricultural Bank of Namibia (AGRIBANK) and the Development Bank of Namibia (DBN). Students are engaged in decision-making exercises, planning, monitoring and evaluation of agricultural extension programmes and plans. Furthermore, they should be engaged in data capturing, analysis report writing and record keeping. During the attachment period University lecturers visit the students to ensure that they are doing practical work as prescribed.

AAEC 3810: RESEARCH PROJECT IN AGRICULTURAL ECONOMICS

Module Title:	RESEARCH PROJECT IN AGRICULTURAL ECONOMICS
Code	AAEC 3810
NQF Level	8
NQF Credits	32
Assessment Strategies:	Continuous assessment (100%) consisting of research proposal write up and presentation of proposal in a seminar, presentation of empirical findings in a second seminar, and grading of the final report
Contact Hours	1 hour per week for 28 weeks
Prerequisite	AAER 3782 Research Methodology in Agricultural Economics
Compulsory/Elective	Compulsory
Semester Offered	1 & 2

Module Content:
Students carry out independent study of a current topic in natural resources and agriculture. The course include participation in meetings organized by the coordinator, work with a faculty advisor to develop a research project, formulate hypotheses, design and carry out preliminary experiments and collect data and test the hypotheses. Students will carry out independent library research, begin experimental work, prepare a written report and make a presentation to other students the proposal and final report. The student will submit a final report written following Guidelines for Scientific Writing.

AAEC 3881: PROJECT PLANNING AND MANAGEMENT

Module Title:	PROJECT PLANNING AND MANAGEMENT
Code	AAEC 3881
NQF Level	8
NQF Credits	12
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact hours	3 lectures per week for 14 weeks; 1 practical for 1.5 hour alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Aims:
The course exposes students to principles and applications of project planning and management in agriculture.

Module Content:
The course includes topics such as: planning process, project cycle, logical framework, financial and economic analysis of project; Project feasibility and appraisal techniques (pay back period, the time value of money, Net Present Value, Benefit cost Ratio, and Internal Rate of Return), and sensitivity analysis; Project monitoring and evaluation, leadership, control, and the problems of identifying project costs and benefits and dealing with sustainability in project implementation

AAEC 3891: INTERNATIONAL AGRICULTURAL TRADE

Module Title:	INTERNATIONAL AGRICULTURAL TRADE
Code	AAEC 3891
NQF Level	8
NQF Credits	12
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 week; 1 practical for 1.5hours alternate week for 14 weeks
Compulsory/Elective	Compulsory
Prerequisite	None
Semester Offered	1

Module Aims:
The course exposes students to concepts and theories of international agricultural trade and policy for exporting countries and importing countries

Module Content:
The course includes topics such as: agricultural trade policies, role and benefits of international trade, welfare impacts of trade policies, importance of multilateral and regional trade agreements such as WTO, SACU, EPAs, and technical barriers to trade currently shaping international trade.

AAEC 3882: AGRICULTURAL POLICY ANALYSIS

Module Title:	AGRICULTURAL POLICY ANALYSIS
Code	AAEC 3882
NQF Level	8
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 2 hours per alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 2

Module Content:
The course includes issues such as: policy issues relevant to Namibia, policy intervention and cost and benefits of policy intervention, food security, food quality and food safety policies, agricultural and environment policy, economic evaluation of alternative policies and their application for farmers, consumers and agribusiness.

AAEA 3882: AGRIBUSINESS MANAGEMENT

Module Title:	AGRIBUSINESS MANAGEMENT
Code	AAEA 3882
NQF Level	8
NQF Credits	12
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	3 lectures per week for 14 weeks; 1 practical for 1.5 hour alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course includes issues such as: Agribusiness management process, industry situation analysis and industry attractiveness, methods of analyzing competitiveness, competitive advantages and how to sustain it; strategic management (environmental scanning, strategy formulation, strategy implementation and control; social responsibility and business ethics, human resource management. Case studies of agribusiness or agro-food complex in Southern Africa.

AAEC 3842: RURAL DEVELOPMENT

Module Title:	RURAL DEVELOPMENT
Code	AAEC 3842
NQF Level	8
NQF Credits	8
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)
Contact Hours	2 lectures per week for 14 weeks; 1 practical for 1 hour alternate week for 14 weeks
Prerequisite	AAEC 3712 Agricultural Extension
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The course includes issues such as: rural poverty and deprivation and the major factors in food security and insecurity –access to basic services: education, health, infrastructure, water and safe sanitation; rural development models; integrated rural development; rural employment and unemployment, incomes and livelihoods; land reform and land resettlement practices and challenges; rural cooperatives –challenges and best practices.

B.SC. AGRICULTURE (ANIMAL SCIENCE) HONS [17BSAS]

PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
UCLC 3509	Computer Literacy	5	8	C	
ULCE 3419	English Communication and Study Skills	4	16	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
SBLG 3511	Introduction to Biology	5	16	C	
SPHY 3501	Physics for Life Sciences I	5	8	C	
SMAT 3511	Basic Mathematics	5	16	C	
Total Credits Semester 1					72
Year 1 Semester 2					
ULEA 3519	English for Academic Purposes	5	16	C	
SCHM 3532	Chemistry for Life Sciences	5	16	C	
SPHY 3532	Physics for Life Sciences II	5	16	C	
SBLG 3512	Diversity of Life	5	16	C	
Total credits Semester 2					64
Total CREDITS YEAR 1					136

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 2 Semester 1					
AAEC 3681	Principles of Microeconomics	6	12	C	None
AAEC 3691	Rural Sociology	6	12	C	None
AASC 3681	Genetics	6	12	C	None
AASC 3691	Introduction to Range Management	6	12	C	None
ACRS 3681	Biostatistics	6	12	C	None
ACSC 3691	Agronomy	6	12	C	None
AFST 3681	General Microbiology	6	12	C	
Total Credits Semester 1					72
Year 2 Semester 2					
AAEC 3682	Production Economics	6	12	C	None
AASC 3612	Biochemistry	6	16	C	SCHM 3532 (Chemistry for Life Sciences)
AASC 3602	Livestock Production Systems	6	8	C	None
AFST 3602	Food Technology	6	8	C	None
Total credits Semester 2					56
Total CREDITS YEAR 2					128

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 3 Semester 1					
AACA 3701	Field Attachment I*	7	8	C	None
AASC 3701	Animal Nutrition	7	8	C	None

ACSE 3781	Agricultural Engineering	7	12	C	None
AASC 3701	Animal Health	6	12	C	FST 3681 (General Microbiology)
AASC3792	Animal Breeding	7	12	C	AASC3681 (Genetics)
AAEC 3781	Farm Planning and Management	7	12	C	None
AASC 3711	Animal Anatomy & Physiology	7	16	C	None
Total Credits Semester 1					76
Year 3 Semester 2					
ACSC 3792	Research Methods	7	12	C	ACRS 3681 (Biostatistics)
AAEC 3712	Agricultural Extension	7	16	C	None
AASF 3702	Feeds and Feeding	7	8	C	AASC 3701 (Animal Nutrition)
AASC3741	Game Ranching	7	8	C	None
AAEC 3702	Entrepreneurship	7	8	C	None
AAEC 3782	Agricultural marketing	7	12	C	None
Total credits Semester 2					68
Total CREDITS YEAR 3					144

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 4 Semester 1					
AACA 3801	Field Attachment II	8	8	C	AACA 3708 (Field Attachment I)
ACSC 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AAEC 3881	Project Planning and Management	8	12	C	None
AASC 3811	Range and Pasture Management	8	16	C	None
AASC 3881	Beef Production	8	12	C	None
AASC 3821	Poultry Production	8	8	C	None
Total Credits Semester 1					72
Year 4 Semester 2					
AASC 3810	Research Project	8	16	C	ACSC 3792 (Research Methods
AASC3892	Small Ruminant Production	8	12	C	None
AASC 3802	Dairy Production	8	8	C	None
AASM 3882	Meat Science	8	12	C	None
AASB 3882	Biotechnology of Animal Reproduction	8	12	C	None
AASC 3822	Pig Production	8	8	C	None
Total credits Semester 2					68
Total CREDITS YEAR 4					140
TOTAL CREDITS FOR THE PROGRAMME					548

MODULE DESCRIPTORS

FIRST YEAR MODULES

CLC3509 COMPUTER LITERACY

Module title: COMPUTER LITERACY
Code: CLC3509
NQF level: 5
Contact hours: 1 lecture theory and 1 lecture practical per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: 2 Practical Tests 50%, 2 Theory Tests 50%
Prerequisites: University Entry

Module Content:
The module covers the following topics. Introduction to Computers: hardware and software, types and categories of computers, usage of Computer devices and peripherals. Working with the windows operating system: File Management, working with multiple programs, using the recycle bin. Using a word processor: formatting a text and documents, spelling check, grammar and thesaurus tools, inserting tables, auto-shapes, clip arts, charts, and mail merge. Spreadsheet: worksheets and workbooks, ranges, formulas and functions, creating graphs, charts, and printing the workbook. Databases: creating tables, relationships, queries, forms and reports. Presentation software: slide layout and master, animations, auto-content wizard and templates. Communication tools: introduction to the Internet, web browsers, search engines, downloading and uploading files, creating and sending messages, email etiquette, internet security, and digital signatures.

LCE3419 ENGLISH COMMUNICATION & STUDY SKILLS

Module title:	ENGLISH COMMUNICATION AND STUDY SKILLS
Code:	LCE3419
NQF Level:	4
Contact hours:	4 hours per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment (60%): two tests (reading and writing), two reading assignments, one oral presentation, Examination (40%): one three hour examination paper
Pre-requisites:	None

Module Content:
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module title:	CONTEMPORARY SOCIAL ISSUES
Code	CSI 3580
NQF Level	5
Contact hours	Equivalent to 1 hour per week for two semesters (Online)
NQF Credits	8
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	1 & 2 (Year Module)

Module Descriptor (Rationale of the module):
The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title	INTRODUCTION TO BIOLOGY
Code	SBLG3511
NQF Level	4
Contact hours	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
NQF Credits	16
Module Assessment:	Continuous assessment (40%): Theory (not less than 3 tests and 2 assignments), 40%. Practicals (not less than 10 marked assignment), 60%. Examination (60%): 3 hour examination paper.
Prerequisite	NSCC (Biology C or better)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
It will consider organization of life, chemical basis of life, carbohydrates, proteins, nucleic acids, lipids and fats, water, cell structure and function, prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton, membrane structure and function, cell communication, mitosis, meiosis, cell reproduction, cell cycle, and cell death. The following topics will be covered: Introduction to systems of classification, taxonomy and binomial nomenclature, including the five kingdoms and the three domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to

Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

SPHY 3501: PHYSICS FOR LIFE SCIENCES I

Module title: PHYSICS FOR LIFE SCIENCES I
Code: SPHY3501
NQF level: 4
NPSC: N/A
Contact hours: 28 Lectures and 14 Practical Sessions/Tutorials
Credits: 8
Module assessment: Continuous Assessment (50%) and 1 x 3-hour Exam Paper (50%). Continuous Assessment will consist of class tests, tutorial tests/assignments and practical reports.
Pre-requisites: None

Module Content:
This module is to introduce Life science students to physics concepts and applications that will be useful to them in their undergraduate studies and carrier. The course will cover the following topics:
Units and significant figures; Motion in one dimension, average velocity, acceleration, freely falling bodies; Vectors and scalars, addition and subtraction of vectors in one and two dimensions, multiplication of vectors, component method of vector addition; Projectiles; Force and weight, Newton's laws and applications, free-body diagrams, friction, motion on inclined planes; Uniform circular motion, period and frequency of motion, centripetal force, banking of curves; Newton's law of Universal gravitation, gravity near the Earth's surface, satellites; Kepler's laws; Work done by a constant force, kinetic energy, work-energy theorem, potential energy, conservation of Mechanical energy, power; Momentum, impulse, conservation of energy and momentum in collisions, elastic and inelastic collisions in one dimension.

SMAT 3511: BASIC MATHEMATICS

Module name: BASIC MATHEMATICS
Code: SMAT 3511
NQF level: 5
Contact hours: 4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite: NSSC Mathematics

Module Content:
Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

LEA3519 ENGLISH FOR ACADEMIC PURPOSES

Module title: ENGLISH FOR ACADEMIC PURPOSES
Code: LEA3519
NQF level: 5
Contact hours: 4 periods per week for 14 weeks
Credits: 16
Module assessment: Continuous assessment (60%): 2 tests (reading and writing), 1 academic written essay,1 oral Presentation; Examination (40%) : One three hour examination paper
Prerequisites: None

Module Content:
This module develops a student's understanding, and competencies regarding academic conventions such as academic reading, writing, listening and oral presentation skills for academic purposes. Students are required to produce a referenced and researched essay written in formal academic style within the context of their university studies. Students are also required to do oral presentations based on their essays. The reading component of the course deals with academic level texts. This involves students in a detailed critical analysis of such texts. The main aim is therefore, to develop academic literacy in English.

SCHM 3532: CHEMISTRY FOR LIFE SCIENCES

Module Title: CHEMISTRY FOR LIFE SCIENCES
Code: SCHM3532
NQF Level: 5
Contact Hours: 56 hours of lectures, 42 hours of practical sessions.
Credits: 16
Module Assessment: CA: 50% (minimum 3 tests 80%, laboratory component 20%, tutorial assignments 10%). Final Exam: 50%; (1 x 3 hour exam paper)
Pre-requisites: None

Module Content:
Classification of Matter: Mixtures and Pure substances; Physical States of Matter; Physical and Chemical Properties. Extensive and Intensive properties.

Measurements: Units, Significant figures; Precision and Accuracy, Factor Label Method. Atomic structure and the Periodic table; Electron configuration; Physical and Chemical properties as predicted from groups. Ionic compounds and Molecular compounds: Writing chemical formulae and naming of ionic and molecular compounds. Average Atomic Mass. The Mole Concept; Percent Composition, Empirical formula and Molecular formula. Stoichiometry: limiting reagent, percent yield. Solutions: electrolytes and non-electrolytes, aqueous solutions, ionic equations; concentrations: percent concentration; molarity, molality; dilution of solutions; structure and solubility. Types of bonds; Lewis structures; Resonance structures; Molecular geometry: the VSEPR model, Polarity of molecules. Acid-base equilibrium: properties of acids and bases; relations of acids and bases, self ionisation of water; strengths of acids and bases; the pH scale; hydrolysis of salts; buffers; acid-base titration. Introduction to organic chemistry: organic compounds; structural formulae and conformations; functional groups; Classes of hydrocarbons: alkanes, cycloalkanes: alkanes; alkenes and alkynes; oxidation and reduction; addition reactions; stereo-isomerism. Alcohols, phenols, thiols, ethers: organic compounds of oxygen; common alcohols and phenols. Carboxylic acids and esters, amines and amides: Introduction to carbohydrates, lipids and porphyrins.

SPHY 3532: PHYSICS FOR LIFE SCIENCES II

Module Title:	PHYSICS FOR LIFE SCIENCES II
Code:	SPHY 3532
NQF Level:	4
Contact Hours:	4 Lectures per week for 14 weeks, Practical Time: 14 sessions (42 hours)
Credits:	16
Module assessment:	Continuous assessment (50%, Minimum 2 tests, 4 assignments and practical reports) and Examination (50%,1 x 3-hour paper)
Pre-requisites:	NSSC Physical Science
Co-Requisites:	SPHY 3401: Physics for Life Sciences I; SMAT3511: Basic Mathematics; SMAT3512: Pre-calculus;

Module Content:
This module introduces life science students to concepts of physics and their application to real life situations, new topics that were not dealt with in PHY 3101 are introduced (i.e., on electricity, magnetism and radioactivity). The content of this course is good enough to help the life science students throughout their undergraduate work and careers. The following topics will also be covered: Electric charge; insulators and conductors; Electric force and
coulomb's law , Electric field and Gauss's law; Electric potential; Capacitance and capacitors; Direct current; Ohm's law and simple circuits; Magnetic field; Alternating current; Transformers; Phenomenological approach to RL and RC circuits; Temperature, gas and thermal expansion; Basic geometrical optics; Radioactivity and its detection.

SBLG3512: DIVERSITY OF LIFE

Module title:	DIVERSITY OF LIFE
Code:	SBLG 3512
Course Equivalent:	NSSC (/HIGH GRADE) Biology
NQF level:	5
Contact hours:	4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits:	16
Module assessment:	Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSCC (Biology C or better)

Module Content:
This module is designed to give students a detailed understanding of the diversity of life. It gives students the broader appreciation of biodiversity in the different ecological habitats. The course shall describe diagnostic characteristics of principle taxonomic categories for each phylum. Coverage of each Phylum shall follow a phylogenetic (evolutionary) approach as well as introduce broad ecological and physiological principles. Various aspects of reproduction and development shall be highlighted. This module prepares students to understand subsequent courses such as Introduction to Ecology and Microbiology, Population Ecology, Comparative physiology, Biogeography, Plant and Animal Form and Function
Topics covered will include viral, bacterial, fungal, algal, animal and plant diversity. It then considers the characteristics and life cycles of the following important algae, animal and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrrophyta, Cryptophyta, Protostomate phyla: Nemertea, Mollusca, Anellida, Arthropoda, Nematoda, Rotifera, Lophophorates, Onychophora. Deuterostomate phyla: Echinodermata, Hemichordata and Chordata (Subphyla: Urochordata, Cephalochordata and Vertebrata: Class Myxiniformes, Petromyzontiformes, Placoderms, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.
Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field.

(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SECOND YEAR MODULES

AASC3681: GENETICS

Module Title:	GENETICS
Code	AASC 3681

NQF Level	6
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks (42hours); Practicals: 1X 3 hour s /fort weekly for 7 weeks (21 hours)
Assessment Strategies	Continuous Assessment: 40% (2 tests + at least 5x marked practicals / assignments). Exam: 60% (1 x2 hour paper).
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This cource introduce and presents principles and methods used in the study of genetics. The emphasis is on application of concepts to solve problems. The course provides a foundation for more advanced studies in the field of agriculture and veterinary medicine. The specific topics to be covered are:
The molecular structure of nucleic acids (DNA and RNA) and gene expression: The double helix model of DNA; Transcription, Translation and the Genetic Code; Regulation of gene expression – the Lac operon; DNA replication in prokaryotes and eukaryotes.
Extension of Mendelian analysis and ratio: Incomplete dominance; co-dominance; multiple allelism; gene interactions; pleiotropy; epistasis; lethal genes, additive gene action.
Chromosomal basis of heredity: Physical structure of chromosomes and DNA Packaging; Karyotypes and Variations; gene linkage; genetic mapping.
Introduction to Quantitative Genetics: Polygenic inheritance; Analysis of polygenic traits; Heritability
Other topics to be covered include: The molecular organization of prokaryotic and eukaryotic genomes; Molecular structure of genes; The Cell Cycle; Mitosis and its genetic significance; Meiosis and its genetic significance; Mutations (types, causes, detection and significance); Sex determination; Sex linkage; sex-limited and sex-influenced.

The module also introduces students to molecular biology techniques: Genetic engineering or recombinant DNA technology; DNA extraction; Polymerase Chain Reaction (PCR); DNA electrophoresis and sequencing; gene cloning; animal cloning and marker-assisted selection.

AASC 3691: INTRODUCTION TO RANGE MANAGEMENT

Module Title:	INTRODUCTION TO RANGE MANAGEMENT
Code	AASC 3691
NQF Level	6
NQF Credits	12
Contact hours:	3 x 1 hour Lecturers / week for 14 weeks; 03 Practical hours alternate weeks for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module content:
This introductory module develops the students' understanding, skills and attitude regarding rangeland resources and principles of rangeland management through coverage of the following: Background and role of rangelands in Namibia, objectives of range management; Basic range terminologies; Identification of the major forage species; Grazing value and ecological status of grasses; Veld types in the farming areas of Namibia, rainfall map, soil types of Namibia, agro-ecological zones; Biotic and abiotic factors affecting rangelands, effect of climate change on rangeland condition; introduction to rangeland restoration, Sustainable range management in Namibia.

AASC 3612: BIOCHEMISTRY

Module Title:	BIOCHEMISTRY
Code	AASC 3612
NQF Level	6
NQF Credits	16
Contact Hours	4 x 1 hour Lectures / week for 14 weeks (56 hours); Practicals: 1X 3 hours /fort weekly for 7 weeks (21 hours)
Assessment Strategies	Continuous Assessment: 40% (2 tests + at least 5x marked practicals / assignments). Exam: 60% (1 x3 hour paper).
Prerequisite	Chemistry for Life Sciences (CHM3532)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Under this course the students will learn about:
PHYSICAL BIOCHEMISTRY: Acids, bases, buffers, pH, ionic strength, molarity; water (structure and ionization).
STRUCTURAL BIOCHEMISTRY: Structure and function of macromolecules (carbohydrates, proteins and lipids), Vitamins, Coenzymes and Cofactors.
ENZYMOLOGY:(Enzymes as organic catalysts; Enzyme nomenclature; Factors affecting activities of enzymes; Enzyme kinetics - The Michaelis-Menten equation; The Lineweaver-Burk plot; Enzyme inhibition; Allosterism.
BIOENERGETICS AND THERMODYNAMICS: Free Energy, Laws of Energy, Activation Energy, Transition States, Endergonic and exergonic reactions.

METABOLISM: Catabolism and Anabolism; Carbohydrate catabolism (Glycolysis, Alcohol and lactic acid Metabolism, Tricarboxylic acid cycle or the TCA cycle; Electron transport chain and oxidative phosphorylation); Regulation of carbohydrate metabolism; Gluconeogenesis; Synthesis of the disaccharides (lactose and sucrose); Synthesis of polysaccharides (starch and glycogen); Lipid metabolism (β-oxidation, malonly CoA); Integration of carbohydrate and fat metabolism; Amino acids and protein metabolism; Urea cycle; The Cori cycle; Pentose phosphate pathway; Glyoxylate cycle in oily seeds.
SPECTROPHOTOMETRY: Fundamental laws of spectrophotometry and absorbance.

AASC 3602: LIVESTOCK PRODUCTION SYSTEMS

Module Title:	LIVESTOCK PRODUCTION SYSTEMS
Code	AASC 3602
NQF Level	6
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; weeks 03 Practical hours alternate weeks for 14
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This module covers the role of livestock and agriculture in the national economy and gives a broad overview of the industry, potentials, competitiveness and constraints. It covers the different production systems, their impacts on the environment, productivity levels and sustainability. Coverage also includes breed and species adaptability to the environments; drought and its effects; the management of ruminants and non-ruminants with regard to breeding, nutrition, health and housing; livestock management facilities; harvesting, handling and marketing of livestock products. The module also discusses the constraints facing communal and commercial farmers in Namibia

THIRD YEAR MODULES

AACA 3701: FIELD ATTACHMENT I

Module Title:	FIELD ATTACHMENT I
Code	AACA 3701
NQF Level	7
NQF Credits	8
Contact Hours	6 weeks of Field Attachment
Assessment Strategies	40% (Class oral presentation); 60% (report write up.)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
This is a practical course where students spend time at real work situations under the supervision of qualified personnel. The students are attached to suitable agricultural businesses and institutions concerned with agricultural economics and rural development and agriculture. During the attachment period University lecturers visit the students to ensure that they are doing practical work as prescribed.

AASC 3701: ANIMAL NUTRITION

Module Title:	ANIMAL NUTRITION
Code	AASC 3701
NQF Level	7
Notional Hours	80
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals); Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module introduces students to basic animal nutrition including key concepts and terminologies and the role of animal nutrition in animal production. The module exposes students to different topics relating to animal nutrition of various livestock species, laboratory feeds analysis and feed evaluation; general comparison of plants, animals and animal feeds; plants and animals as feed sources with special focus on nutritive values, availability, affordability and laws associated with the use of either; feed fractions and their nutritional implications; digestive system and physiology of farm animals; digestibility and degradability experiments; use of near infrared Reflectance (NIR) Spectroscopy, spectrophotometer in animal nutrition; use of feed value estimates and; mineral and vitamin nutrition.

AASC 3791: ANIMAL HEALTH

Module Title:	ANIMAL HEALTH
Code	AASC 3791

NQF Level	7
Notional Hours	80
NQF Credits	12
Contact hours:	3 x 1 hour Lectures / week for 14 weeks; 03 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals); Exam: 60% (1 x2 hr paper)
Prerequisite	FST 3681 (General Microbiology)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
VIRAL DISEASES: Gumboro Disease, Newcastle Disease, Rabies, FMD, Bovine Malignant Catarrhal Fever, Lumpy Skin Disease (LSD), African Swine Fever, Orf. PRION DISEASES: Bovine Spongiform Encephalopathy. BACTERIAL DISEASES: Anthrax, Mastitis, Brucellosis, Anaplasmosis, Heartwater, Contagious Bovine Pleuropneumonia, Caseous Lymphadenitis. NUTRITIONAL AND METABOLIC DISORDERS: Piglet anaemia, Bloat, Milk fever, Traumatic reticuloperitonitis (TRP), Phytotoxicosis (plant poisoning) in Namibia. PARASITOLOGY: -Host-parasite relationship, types of host, sources and carriers, sources of infection, modes of transmission and entry of parasites, harmful effects of parasites, iimmunity in parasitic infections, antibody response in parasite infections, Antigenic variation, Immunotolerance PROTOZOAN DISEASES: Coccidiosis, Trichomoniasis, Babesiosis, Anaplasmosis, Toxoplasmosis, Trypanosomiasis. HELMINTHIASIS: Ascariasis, Parasitic gastroenteritis (PGE), Trichinellosis, Cysticercosis, Stilezia hepatica, Echinococcosis, ECTOPARASITES: Mange, Sarcoptic, Chorioptic, Demodecosis. Ticks – hard and soft ticks, Lice, Flies, Fleas,

AASC 3741: GAME RANCHING

Module Title:	GAME RANCHING
Code	AASC 3741
NQF Level	7
Notional Hours	80
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; 03 Practical hours alternate weeks for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 10 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Roles of Game Ranching at the farm level & contribution to the national economy; Ethics & reasons for conserving & preserving game animals; Comparative productivity indices of selected game and domestic animals; Challenges and constraints to Game Ranching; Ecological roles, social behaviours and peculiar characteristics/identification of game species of interest i.e. small & large herbivores, carnivores, dangerous game & game birds; Eco-zones where game could be an economic asset; Game ranch management including selecting a suitable game farm; Converting a livestock ranch into a game farm; Game habitat identification & evaluation, carrying capacity & stocking rates; Practising a crude form of grazing rotation & habitats utilization through the use of fence, fire, water & licks; Fire; Water provision; Look-out posts/towers; Dietary supplementation; Basic concepts on game population
dynamics & monitoring; Game counting including mathematical computations; Effect of diseases and parasites on game populations; Systems of production and their economic returns; Consumptive and non-consumptive utilization of game animals; Game capture, infrastructure and transportation including legal and operational requirements; Meat and trophy processing with special focus on animal skinning, preparation of trophies & final trophy handling and, by-products; Importance, establishment & legal requirements of game conservancies; Game farm economics: Development capital, running costs & profitability, general trends and; Markets and marketing.

AASC 3711: ANIMAL ANATOMY AND PHYSIOLOGY

Module Title:	ANIMAL ANATOMY AND PHYSIOLOGY
Code	AASC 3711
NQF Level	7
Notional Hours	160
NQF Credits	16
Contact Hours	4 x 1 hour Lectures per week; practicals: 4 hr per week. Duration of 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals). Exam: 60% (1 x3 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course deals with the concepts pertaining to the morphology function of the circulatory, respiratory, nervous, skeletal and locomotory systems of farm animals (ruminants, mono-gastric animals, and poultry). The anatomical and functional interrelationship of these systems and their embryonic development with special reference to their progenitors and derivatives are discussed. Practical classes that involve the use of carcass dissections, examination of internal organs in dead animals, and the study of laboratory models, help in the understanding of theoretical concepts discussed in the lectures.

AASF 3702: FEEDS AND FEEDING

Module Title:	FEEDS AND FEEDING
Code	AASF 3702
NQF Level	7
NQF Credits	8
Contact Hours	2 x 1 hour Lectures / week for 14 weeks; 02 Practical hours alternate week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)
Co-requisite	Animal Nutrition (AASC 3701)
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This module introduces students to basic feeds and feeding concepts and terminologies. They will learn about livestock feeds and feed resources classification such as browse, cakes/concentrates, crop residues, hays, silages, supplements e.g. energy, protein, mineral & vitamins and, feed additives will be covered; comparative nutritional values of different feedstuffs; analysis and effects of phenolics, tannins and other anti-quality factors in animal feeding; acquaint students to ways of improving feeding value of low quality feedstuffs; nutrient requirements of farm animals for maintenance, growth, reproduction and other productive functions; significance and use of feeding standards & tables; applied animal feeding & ration formulation including livestock feeding systems, ration formulation methods & feed mixing for different farm animals; feed intake regulation and prediction; diagnosis, treatment and prevention of metabolic disorders.

AASC 3792: ANIMAL BREEDING

Module Title:	ANIMAL BREEDING
Code	AASC 3792
NQF Level	7
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 02 Practical hours alternate week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (7 x assignments + 2 tests + 1 written report). Exam: 60% (1 x2 hr paper)
Prerequisite	Genetics (AASC 3601)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module covers the application of population and quantitative genetics principles to the improvement of livestock and poultry. Concepts in population genetics including change in gene frequencies as the basis for livestock improvement by selection, Hardy-Weinberg equilibrium, forces that change gene frequencies are discussed. The module covers: causes of variation, measures of variation, variance partitioning; estimation of heritability; correlations between traits; principles of selection; genetic relationships. The practical application of the principles of selection are discussed emphasizing genetic evaluation using BLUP, methods of breed improvement by selection and utilization of different mating systems in beef cattle, dairy cattle, swine, sheep and goats. Advances in molecular genetics and their application to breeding are also covered including: types of genetic markers (RFLPs, microsatellites, SNPs); uses of DNA technologies (marker assisted selection, gene introgression); major genes affecting ovulation rate in sheep; QTL for internal nematode resistance in sheep.

FOURTH YEAR MODULES

AACA 3801: FIELD ATTACHMENT II

Module Title:	FIELD ATTACHMENT II
Code	AACA 3801
NQF Level	8
NQF Credits	8
Contact Hours	8 practical hours per day for 6 weeks
Assessment Strategies	40% (Class oral presentation); 60% (report write up.)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
This is a practical course where students spend time at real work situations under the supervision of qualified personnel. The students are attached to suitable agricultural businesses such the Ministry of Agriculture and Forestry's Green Scheme projects, Meatboard Board of Namibia, Agronomic Board, and institutions concerned with agricultural economics and rural development and agriculture such as the Agricultural Bank of Namibia (AGRIBANK) and the Development Bank of Namibia (DBN). Students are engaged in decision-making exercises, planning, monitoring and evaluation of agricultural extension programmes and plans. Furthermore, they should be engaged in data capturing, analysis report writing and record keeping. During the attachment period University lecturers visit the students to ensure that they are doing practical work as prescribed.

AASC 3810: RESEARCH PROJECT

Module Title:	RESEARCH PROJECT
Code	AASC 3810
NQF Level	8
NQF Credits	32

Contact hours:	32 hours
Assessment Strategies	Continuous Assessment: Continuous assessment 40% (oral presentation) 60% Project write-up
Prerequisite	CSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
Research based.
Methods of facilitation of learning
Lectures, written assignments, group work, class discussions and presentations.

AASC 3811: RANGE AND PASTURE MANAGEMENT

Module Title:	RANGE AND PASTURE MANAGEMENT
Code	AASC 3811
NQF Level	8
NQF Credits	16
Contact Hours	4 x 1 hour Lectures per week; practicals: 4 hr per week. Duration of 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x3 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module develops the students' understanding, skills and attitude regarding range and pasture management through coverage of the following: Namibian range types and their characteristics; Overview of the carrying capacity of Namibian range types and carrying capacity determination; Morphology of common range plants including structure of a grass plant; Flowering, stem & leaf development, elongation and tillering; Growth cycle of plants and plant & seed dormancy; Introduction to systematic botany with special focus on Annuals & Perennials range plants, C3 vs. C4, shrubs, trees & bushes; Plant succession, retrogression and die-back rate of selected range plants; Factors influencing succession; State & transition models; Animal-plant interactions on range: Animal-plant interface; The role of animal breed/size, dentition/digestive system vs. diet preference; Role of faeces, urine and trampling on range plants; Plant adaptation to herbivory; Grazing systems & stocking rates; Continuous and rotational including multi-camp, non-selective & controlled selective grazing; Deferment; Zonal/centripetal grazing; Range degradation: Bush encroachment, overgrazing, desertification and erosion; Land reclamation/restoration. Range evaluation and monitoring; Range condition & trend assessment; Fodder flow management and forage conservation.

AASC 3881: BEEF PRODUCTION

Module Title:	BEEF PRODUCTION
Code	AASC 3881
NQF Level	8
Notional Hours	160
NQF Credits	12
Contact Hours	3 x 1 hour Lectures per week; practicals: 2 hr per alternate week. Duration of 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module familiarizes students with the Namibian beef industry including its importance, legal and policy framework, Namibia's trade partners in meat, opportunities and challenges faced by the industry. The module develops the students' understanding and skills in the following topics: Beef cattle breeds and systems of production; Major feeding systems including supplementary feeding and potential nutritional & metabolic disorders; Requisite facilities & equipment for a beef ranch; Beef cattle breeding and selection with special focus on bio-economic traits, quality attributes of a beef animal; breeding objectives in beef cattle; Commercial beef cattle breeding programmes including straight breeding, rotational crossbreeding, terminal sire system; Continuous versus restricted breeding; winter vs summer mating systems; AI vs natural service; Herd structures, grouping and replacement; Calving & calf management including dystocia and assisted calving; Sound beef cattle husbandry practices; Beef cattle growth, feed conversion ratio and efficiency; Diseases and parasites; Marketing, grading & transportation of beef animals; Hide processing and quality; Performance and progeny testing; Planning a beef cattle enterprise and; Livestock & livestock products traceability including FAN Meat Scheme.

AASC 3821: POULTRY PRODUCTION

Module Title:	POULTRY PRODUCTION
Code	AASC 3821
NQF Level	8
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; 03 Practical hours alternate weeks for 14weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals)Exam: 60% (1 x2 hr paper)
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course covers theoretical and practical aspect of poultry production including production systems, routine management, feeding requirements of different classes of chicken (chicks, growers, finishers, layers), health, breeding and housing. Aspects of reproduction including egg formation and embryo development, egg incubation and hatching are also covered. Common diseases, disease prevention and control, special attention will be focused on emerging disease threats (e.g. Avian influenza). Industry stratification (breeding companies, multipliers and producers) and vertical integration (production, marketing and processing) will also be discussed. Coverage of recent developments in the Namibian poultry industry will expose the students challenges and opportunities in the sector.

AASC 3882: SMALL RUMINANT PRODUCTION

Module Title:	SMALL RUMINANT PRODUCTION
Code	AASC 3882
NQF Level	8
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 02 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This module familiarizes students with the Namibian small stock industry including its importance, legal and policy framework, Namibia's trade partners in meat, opportunities and challenges. The module also covers breed characteristics of sheep and goats, production systems, requisite facilities and equipment. Students are introduced to concepts pertaining to feeding habits of sheep and goats, grazing management and systems and the nutrient requirement of sheep and goats. The module further covers animal selection and breeding, including breeding/mating seasons and methods/systems, flock composition and selection of replacement animals. The module develops the students' understanding in lambing/kidding management including dystocia and fostering. Students are expected to conduct practicals in animal husbandry techniques. Coverage also includes selecting the right animals for marketing, marketing costs, marketing channels, transportation and slaughter, livestock traceability, processing of skins, animal welfare and health.

AASC 3802: DAIRY PRODUCTION

Module Title:	DAIRY PRODUCTION
Code	AASC 3802
NQF Level	8
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; 02 Practical hours alternate weeks for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Semester Offered	2

Module Content:
This module will cover: dairy herd health management; routine management practices on a dairy farm; dairy cattle feeding; management of pregnant and dry cows, bulls calves and heifers; breeding and breeding efficiency; farm records; physiology of lactation; milk harvesting, factors which affect milk yield and composition, production of high quality milk and quality control in milk and milk products. It will also look at milk marketing and dairy animal health. Dairy development trends in Namibia will also be covered.

AASM 3882: MEAT SCIENCE

Module Title:	MEAT SCIENCE
Code	AASM 3882
NQF Level	8
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 02 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 10 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The module covers: muscle physiology; growth and carcass composition of meat animals; slaughter procedures for pigs, sheep, cattle and poultry; postmortem changes in muscle and its conversion into meat, identification of wholesale and retail cuts. Coverage also includes abattoir hygiene with emphasis on the importance of abattoir hygiene, microbiology, general layout and construction, personal hygiene, handling of waste and condemned material, pest control and sanitation. Topics such as meat hygiene, spoilage and preservation and basic meat processing are also covered. The module develops the students' understanding of physical, sensory and chemical meat quality as well as the factors affecting quality. The module

also provides students with knowledge on the principles of quality management systems: Good Manufacturing Practices (GMP's); food safety; food hygiene and sanitation, food laws and regulations; codex alimentarius; Hazard Analysis Critical Control Point (HACCP) and ISO 9001:2000. Consumer concerns regarding the consumption of meat are also discussed.

AASB 3882: BIOTECHNOLOGY OF ANIMAL REPRODUCTION

Module Title:	**BIOTECHNOLOGY OF ANIMAL REPRODUCTION**
Code	AASB 3882
NQF Level	8
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 03 Practical hours alternate for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This module aims to develop the students' understanding, skills and attitude regarding the application of Biotechnology of Animal Reproduction through a coverage of genetic engineering in domestic animals including: introduction to the methods applied in biotechnological of animal reproduction; the use of biotechnology for animal selection; methods applied in genetic engineering; gene transfer through its insertion into zygote nucleolus; the importance and use of embryo transfer in domestic animals; theoretic and practical procedures oestrous synchronization and embryo transfer; the use of reproductive hormonal compounds for triggering multiple ovulation; regulation of herd oestrous cyclicity and/or oestrous synchronization; method applied for triggering superovulation; artificial insemination and factors affecting successful fertilization; factors affecting effective hormonal action; oocyte retrieval and fertilization; embryo retrieval, evaluation and grading; embryo dissections and cryopreservation or transfer; sperm and embryo cryopreservation; the mechanism of embryo cryopreservation and thawing; theoretic and practical aspects of embryo microsurgery; methods of embryo sexing; factors affecting embryo survival rate after cryopreservation and transfer; the effect of donor synchrony and recipient asynchrony in embryo transfer, immune-genetic aspects of embryo and respective female recipient, veterinary aspects taken into consideration in embryo donor and recipient selection. Precautions in embryo transfer, in vitro maturation and in vitro fertilization; theoretical aspects of cloning;

AASC 3822: PIG PRODUCTION

Module Title:	PIG PRODUCTION
Code	AASC 3822
NQF Level	7
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; for 14 weeks; 03 Practical hours alternate weeks for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals); Exam: 60% (1 x2 hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Contents:
Students will be introduced to methods of pig farming in both intensive and extensive systems. The module will cover routine management practices, feeding, herd health, animal behavior and welfare, housing and marketing. Feed resources and systems of feeding will also be covered. Additional coverage shall be on factors influencing profitability of pig enterprises and trends in the pig industry worldwide and in Namibia.

B.SC. AGRICULTURE (CROP SCIENCE) HONS (Ogongo Campus) [17BSCS]

PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
UCLC 3509	Computer Literacy	5	8	C	
ULCE 3419	English Communication and Study Skills	4	16	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
SBLG 3511	Introduction to Biology	5	16	C	
SPHY 3501	Physics for Life Sciences I	5	8	C	
SMAT 3511	Basic Mathematics	5	16	C	
Total Credits Semester 1					72
Year 1 Semester 2					
ULEA 3519	English for Academic Purposes	5	16	C	
SCHM 3532	Chemistry for Life Sciences	5	16	C	
SPHY 3532	Physics for Life Sciences II	5	16	C	
SBLG 3512	Diversity of Life	5	16	C	
SMAT3512	Pre-calculus	5	16	C	
Total credits Semester 2					80
Total CREDITS YEAR 1					152

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 2 Semester 1					
AAEC 3681	Principles of Microeconomics	6	12	C	None
AAEC 3691	Rural Sociology	6	12	C	None
AASC 3681	Genetics	6	12	C	None
ACSC3681	Plant Science	6	12	C	None
ACRS 3681	Biostatistics	6	12	C	None
ACSC 3691	Agronomy	6	12	C	
Total Credits Semester 1					72
Year 2 Semester 2					
AAEC 3682	Production Economics	6	12	C	None
AAEC 3692	Principles of Macroeconomics	6	12	C	None
AASC 3612	Biochemistry	6	16	C	SCHM 3532 (Chemistry for Life Sciences)
AASC 3602	Livestock Production Systems	6	8	C	None
ACRS3682	Soil Science for Crop Production	6	12	C	None
Total credits Semester 2					60
Total CREDITS YEAR 2					132

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite

Year 3 Semester 1					
ACSE 3781	Agricultural Engineering	7	12	C	None
ACSC 3791	Field Crop Production	7	12	C	ACSC 3681 (Plant Science)
ACSC 3721	Weed Science	7	8	C	None
AACA 3701	Field Attachment I	7	8	C	None
ACRS3781	Plant Breeding	7	12	C	AASC 3681 (Genetics)
AAEC 3781	Farm Planning and Management	7	12	C	None
Total Credits Semester 1					72
Year 3 Semester 2					
ACSC 3792	Research Methods	7	12	C	ACSC 3792 (Research Methods)
ACSC 3702	Crop Ecophysiology	7	8	C	ACSC3681 (Plant Science)
ACSC 3722	Crop Handling and Storage	7	8	C	None
ACSC 3742	Farm mechanisation	7	8	C	ACSE3781 (Agricultural Engineering)
AAEC 3712	Agricultural Extension	7	16	C	None
AAEC 3782	Agricultural Marketing	7	12	C	None
Total credits Semester 2					64
Total CREDITS YEAR 3					136
Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 4 Semester 1					
AACA 3801	Field Attachment II	8	8	C	AACA 3708 (Field Attachment I)
ACSC 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AAEC 3881	Project Planning and Management	8	12	C	None
ACSC3741	Horticulture I, Vegetables, Herbs and Spices	7	8	C	ACSC3681 (Plant Science) and ACSC3691 (Agronomy)
ACSC 3841	Seed Science and Technology	8	8	C	CSC 3681 (Plant Science)
ACSC 3861	Agricultural Entomology	8	8	C	None
ACSC3881	Soil Fertility and Plant Nutrition	8	12	C	ACRS3682(Soil Science for Crop Production)
Total Credits Semester 1					64
Year 4 Semester 2					
ACSC 3810	Research Project	8	16	C	ACSC 3792 (Research Methods
ACSC 3892	Horticulture II—Fruit Crops and Ornamental Plants	8	12	C	ACSC 3681 (Plant Science)
ACSC 3802	Plant Pathology	8	8	C	None
ACSC 3822	Plant Biotechnology	8	8	C	AASC 3681 (Genetics)
ACSC 3812	Soil Conservation and Irrigation	8	16	C	ACRS 3682 (Soil Science for Crop Production)
Total credits Semester 2					60
Total CREDITS YEAR 4					124
TOTAL CREDITS FOR THE PROGRAMME					544

MODULE DESCRIPTORS

FIRST YEAR MODULES

CLC3509 COMPUTER LITERACY

Module title:	COMPUTER LITERACY
Code:	CLC3509
NQF level:	5
Contact hours:	1 lecture theory and 1 lecture practical per week for 14 weeks
Credits:	8
Module assessment:	Continuous Assessment 100%: 2 Practical Tests 50%, 2 Theory Tests 50%
Prerequisites:	University Entry

Module Content:
The module covers the following topics. Introduction to Computers: hardware and software, types and categories of computers, usage of Computer devices and peripherals. Working with the windows operating system: File Management, working with multiple programs, using the recycle bin. Using a word processor: formatting a text and documents, spelling check, grammar and thesaurus tools, inserting tables, auto-shapes, clip arts, charts, and mail merge. Spreadsheet: worksheets and workbooks, ranges, formulas and functions, creating graphs, charts, and printing the workbook. Databases: creating tables, relationships, queries, forms and reports. Presentation software: slide layout and master, animations, auto-content wizard and templates. Communication tools: introduction to the Internet, web browsers, search engines, downloading and uploading files, creating and sending messages, email etiquette, internet security, and digital signatures.

LCE3419 ENGLISH COMMUNICATION & STUDY SKILLS

Module title:	ENGLISH COMMUNICATION AND STUDY SKILLS
Code:	LCE3419
NQF Level:	4
Contact hours:	4 hours per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment (60%): two tests (reading and writing), two reading assignments, One oral presentation, Examination (40%): one three hour examination paper
Pre-requisites:	None

Module Content:
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module title:	CONTEMPORARY SOCIAL ISSUES
Code	CSI 3580
NQF Level	5
Contact hours	Equivalent to 1 hour per week for two semesters (Online)
NQF Credits	8
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	1 & 2 (Year Module)

Module Descriptor (Rationale of the module):
The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title	INTRODUCTION TO BIOLOGY
Code	SBLG3511
NQF Level	4
Contact hours	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
NQF Credits	16
Module Assessment:	Continuous assessment (40%): Theory (not less than 3 tests and 2 assignments), 40%. Practicals (not less than 10 marked assignment), 60%. Examination (60%): 3 hour examination paper.

Prerequisite	NSCC (Biology C or better)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
It will consider organization of life, chemical basis of life, carbohydrates, proteins, nucleic acids, lipids and fats, water, cell structure and function, prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton, membrane structure and function, cell communication, mitosis, meiosis, cell reproduction, cell cycle, and cell death. The following topics will be covered: Introduction to systems of classification, taxonomy and binomial nomenclature, including the five kingdoms and the three domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

SPHY 3501: PHYSICS FOR LIFE SCIENCES I

Module title:	PHYSICS FOR LIFE SCIENCES I
Code:	SPHY3501
NQF level:	4
NPSC:	N/A
Contact hours:	28 Lectures and 14 Practical Sessions/Tutorials
Credits:	8
Module assessment:	Continuous Assessment (50%) and 1 x 3-hour Exam Paper (50%). Continuous Assessment will Consist of class tests, tutorial tests/assignments and practical reports.
Pre-requisites:	None

Module Content:
This module is to introduce Life science students to physics concepts and applications that will be useful to them in their undergraduate studies and carrier. The course will cover the following topics:
Units and significant figures; Motion in one dimension, average velocity, acceleration, freely falling bodies; Vectors and scalars, addition and subtraction of vectors in one and two dimensions, multiplication of vectors, component method of vector addition; Projectiles; Force and weight, Newton's laws and applications, free-body diagrams, friction, motion on inclined planes; Uniform circular motion, period and frequency of motion, centripetal force, banking of curves; Newton's law of Universal gravitation, gravity near the Earth's surface, satellites; Kepler's laws; Work done by a constant force, kinetic energy, work-energy theorem, potential energy, conservation of Mechanical energy, power; Momentum, impulse, conservation of energy and momentum in collisions, elastic and inelastic collisions in one dimension.

SMAT 3511: BASIC MATHEMATICS

Module name:	BASIC MATHEMATICS
Code:	SMAT 3511
NQF level:	5
Contact hours:	4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module Content:
Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

LEA3519 ENGLISH FOR ACADEMIC PURPOSES

Module title:	ENGLISH FOR ACADEMIC PURPOSES
Code:	LEA3519
NQF level:	5
Contact hours:	4 periods per week for 14 weeks
Credits:	16
Module assessment:	Continuous assessment (60%): 2 tests (reading and writing), 1 academic written essay,1 oral Presentation; Examination (40%) : One three hour examination paper
Prerequisites:	None

Module Content:
This module develops a student's understanding, and competencies regarding academic conventions such as academic reading, writing, listening and oral presentation skills for academic purposes. Students are required to produce a referenced and researched essay written in formal academic style within the context of their university studies. Students are also required to do oral presentations based on their essays. The reading component of the course deals with academic level texts. This involves students in a detailed critical analysis of such texts. The main aim is therefore, to develop academic literacy in English.

SCHM 3532: CHEMISTRY FOR LIFE SCIENCES

Module Title:	CHEMISTRY FOR LIFE SCIENCES
Code:	SCHM3532
NQF Level:	5
Contact Hours:	56 hours of lectures, 42 hours of practical sessions.
Credits:	16
Module Assessment:	CA: 50% (minimum 3 tests 80%, laboratory component 20%, tutorial assignments 10%). Final Exam: 50%; (1 x 3 hour exam paper)
Pre-requisites:	None

Module Content:
Classification of Matter: Mixtures and Pure substances; Physical States of Matter; Physical and Chemical Properties. Extensive and Intensive properties.
Measurements: Units, Significant figures; Precision and Accuracy, Factor Label Method. Atomic structure and the Periodic table; Electron configuration; Physical and Chemical properties as predicted from groups. Ionic compounds and Molecular compounds: Writing chemical formulae and naming of ionic and molecular compounds. Average Atomic Mass. The Mole Concept; Percent Composition, Empirical formula and Molecular formula. Stoichiometry: limiting reagent, percent yield. Solutions: electrolytes and non-electrolytes, aqueous solutions, ionic equations; concentrations: percent concentration; molarity, molality; dilution of solutions; structure and solubility. Types of bonds; Lewis structures; Resonance structures; Molecular geometry: the VSEPR model, Polarity of molecules. Acid-base equilibrium: properties of acids and bases; relations of acids and bases, self ionisation of water; strengths of acids and bases; the pH scale; hydrolysis of salts; buffers; acid-base titration. Introduction to organic chemistry: organic compounds; structural formulae and conformations; functional groups; Classes of hydrocarbons: alkanes, cycloalkanes: alkanes; alkenes and alkynes; oxidation and reduction; addition reactions; stereo-isomerism. Alcohols, phenols, thiols, ethers: organic compounds of oxygen; common alcohols and phenols. Carboxylic acids and esters, amines and amides: Introduction to carbohydrates, lipids and porphyrins.

SPHY 3532: PHYSICS FOR LIFE SCIENCES II

Module Title:	PHYSICS FOR LIFE SCIENCES II
Code:	SPHY 3532
NQF Level:	4
Contact Hours:	4 Lectures per week for 14 weeks, Practical Time: 14 sessions (42 hours)
Credits:	16
Module assessment:	Continuous assessment (50%, Minimum 2 tests, 4 assignments and practical reports) and Examination (50%,1 x 3-hour paper)
Pre-requisites:	NSSC Physical Science
Co-Requisites:	SPHY 3401: Physics for Life Sciences I; SMAT3511: Basic Mathematics; SMAT3512: Pre-calculus;

Module Content:
This module introduces life science students to concepts of physics and their application to real life situations, new topics that were not dealt with in PHY 3101 are introduced (i.e., on electricity, magnetism and radioactivity). The content of this course is good enough to help the life science students throughout their undergraduate work and careers. The following topics will also be covered: Electric charge; insulators and conductors; Electric force and
coulomb's law , Electric field and Gauss's law; Electric potential; Capacitance and capacitors; Direct current; Ohm's law and simple circuits; Magnetic field; Alternating current; Transformers; Phenomenological approach to RL and RC circuits; Temperature, gas and thermal expansion; Basic geometrical optics; Radioactivity and its detection.

SBLG3512: DIVERSITY OF LIFE

Module title:	DIVERSITY OF LIFE
Code:	SBLG 3512
Course Equivalent:	NSSC (/HIGH GRADE) Biology
NQF level:	5
Contact hours:	4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits:	16
Module assessment:	Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSCC (Biology C or better)

Module Content:
This module is designed to give students a detailed understanding of the diversity of life. It gives students the broader appreciation of biodiversity in the different ecological habitats. The course shall describe diagnostic characteristics of principle taxonomic categories for each phylum. Coverage of each Phylum shall follow a phylogenetic (evolutionary) approach as well as introduce broad ecological and physiological principles. Various aspects of reproduction and development shall be highlighted. This module prepares students to understand subsequent courses such as Introduction to Ecology and Microbiology, Population Ecology, Comparative physiology, Biogeography, Plant and Animal Form and Function
Topics covered will include viral, bacterial, fungal, algal, animal and plant diversity. It then considers the characteristics and life cycles of the following important algae, animal and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrrophyta, Cryptophyta, Protostomate phyla: Nemertea, Mollusca, Anellida, Arthropoda, Nematoda, Rotifera, Lophophorates, Onychophora. Deuterostomate phyla: Echinodermata, Hemichordata and Chordata (Subphyla: Urochordata, Cephalochordata and Vertebrata: Class Myxiniformes, Petromyzontiformes, Placoderms, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.

Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field.

(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SMAT 3512: PRE-CALCULUS

Module Title:	PRE-CALCULUS
Code:	SMAT 3512
NQF level:	5
Contact hours:	4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module Content:
Functions: one-to-one and onto functions, horizontal line test, composition of functions, inverse of a function. Introduction to exponential and logarithmic functions. Limit of a function: definition, left and right limits, infinite limits, limits at infinity, continuity in terms of limits. Differentiation: rate of change, derivative of a function, rules of differentiation, increasing and decreasing functions and graph sketching. Integration: antiderivatives, the definite integral, area under a graph. Trigonometry: further trigonometric identities, area of a sector and segment of a circle, derivatives and integrals of trigonometric functions.
(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SECOND YEAR MODULES

ACSC3681: PLANT SCIENCE

Module title:	Plant Science
Code:	ACSC3681
NQF level:	6
Contact hours:	03 Lecture hours/week for 14 weeks; 02 Practical hours/week for 14 weeks
Credits:	12
Assessment Strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Plant Taxonomy: binomial system, use of taxonomic keys. Anatomy of angiosperms; cell types, tissues types. Morphology and anatomy of root, stem, leaves, flowers, fruits. Types of inflorescences. Pollination: process, methods. Double fertilization. Agriculturally important plant families. Photosynthesis: chemistry, energy requirements, C3/C4 plants. Respiration and photorespiration. Water: importance, uptake, transpiration, water potential and tugor pressure. Translocation: sources and sinks. Nutrient uptake and transport: passive and active transport. Plant growth regulators.

ACRS3681: BIOSTATISTICS

Module Title:	Biostatistics
Code	ACRS3681
NQF Level	6
Contact hours	3 Lecture hours/week for 14 weeks; 3 tutorial/practical hours alternate weeks for 14 weeks
Assessment Strategies	Continuous Assessment: 40 % at least three assessments; Examination (60%): (01 x 02 hour examination paper)
NQF Credits	12
Prerequisite	SMAT3511 Basic Mathematics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Definition of statistics, descriptive and inferential statistics. Qualitative and quantitative data, primary versus secondary data. Sampling and sample size determinations, and replications. Presentation of data: tables, charts, graphs. Measures of central tendency: mean, mode, median. Measures of dispersion: standard deviation, coefficient of variation, standard error. Probability, Bayes' theorem, combinations and permutations, Binomial, Poisson, and Normal distributions, T-test and F-distribution mean comparisons, Analysis of variance, analysis assumptions. Single and multiple factor experiments, correlation and linear regression, transformations. Research process: research problem formulation, research objectives, hypothesis formulation. Basic experimental designs: completely randomized, randomized complete block, Latin square, Split plot.

ACSC 3691: AGRONOMY

Module Title:	AGRONOMY

Code	ACSC 3691
NQF Level	6
National Hours	80
Contact hours	02 Lecture hours / week for 14 weeks; 03 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hour paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Choice of land for different crops. Environmental factors affecting crop choice: temperature, rainfall, solar radiation, photoperiodism. Time of planting; pre- and post-rain planting. Land preparation: aims, tillage systems—conventional, minimum, conservation tillage. Review of tillage and cultivation equipment for large-scale and small-scale farmers. Seeding: factors affecting seed quality, seeding depth, seeding rate, plant population. Fertilizer application times and methods. Calculation of row and intra-row spacing and fertilizer rates. Cultural practices for weed control. Harvesting: physiological maturity and harvest maturity, harvest index. Cropping systems—monoculture, mixed culture and intercropping.

ACRS3682: SOIL SCIENCE FOR CROP PRODUCTION

Module Title:	SOIL SCIENCE FOR CROP PRODUCTION
Code	ACRS3682
NQF Level	6
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hour paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Definition of soil. Soil formation. Soil as a triphasic system: texture, soil organic matter, soil organisms and nutrient cycles. Clay minerals, soil colloids and cation exchange capacity; Soil structure. Bulk density. Soil moisture, soil water potential and movement in saturated and unsaturated soils; field capacity and water holding capacity. Basics of soil fertility and plant nutrition: macro- and micro-nutrients and their functions, pH and nutrient availability. Soil classification: soil profile, horizons, and influence of environmental factors. Common soil classification systems: USDA (soil taxonomy) and FAO classification systems. Major soil types

THIRD YEAR MODULES

ACSC3791: FIELD CROP PRODUCTION

Module Title:	Field Crop Production
Code	ACSC 3791
NQF Level	7
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hour paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Cereals crops (pearl millet, maize, wheat, sorghum, rice), oilseed crops (sunflower, soybean, groundnut, caster bean), grain legumes (cowpea, bambara nuts, kidney beans), fiber crops (cotton, sisal), root and tuber crops (sweet potatoes, cassava, Irish potatoes) grown in Namibia: their importance to the economy, uses, soil and climatic requirements and production practices. Areas where grown, limitations to production.

ACSE3781: AGRICULTURAL ENGINEERING

Module Title:	AGRICULTURAL ENGINEERING
Code	ACSE3781
NQF Level	7
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hour paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Fundamentals of Engineering; Farm Power sources; Internal Combustion Engines, electricity, wind energy, solar energy. Tractors. Machinery for different operations: Tillage; Planting; Cultivation; Harvesting. Land Surveying; Water Resources; Soil and Water Conservation (Processes of Erosion; Conservation Methods); Irrigation and Drainage; Post Harvest Handling, Storage and Processing; Farm Structures, workshop safety and technology.

ACSC3741: HORTICULTURE I—VEGETABLES, HERBS AND SPICES

Module Title:	HORTICULTURE I—VEGETABLES, HERBS AND SPICES
Code	ACSC 3741
NQF Level	7
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Prerequisite	ACSC 3681 Plant Science and ACSC 3691 Agronomy
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Importance of vegetables and to human nutrition and the economy. Vegetable nursery establishment and management, transplanting. Specific environment requirements of vegetables. Specifics in cultivation systems of vegetables. Plant growth regulators and their use in commercial horticulture: improvement of fruit set; modification of sex ratios, parthenogenesis. Main vegetables – fruit vegetables, root vegetables, leaf vegetables, perennial vegetables, leguminous vegetables – their propagation, cultivation, harvest and handling. Indigenous vegetables: plant domestication and adaptation principles. Hydroponics: hydroponics principles and infrastructure. Mushroom production: cultivation technology of common mushroom species. Spices, medicinal and pharmaceutical plants: most common medicinal species – their propagation, cultivation and utilization. Harvesting of vegetable crops: properties of vegetable commodities: moisture content, shelf life.

ACSC 3721: WEED SCIENCE

Module Title:	WEED SCIENCE
Code	ACSC 3721
NQF Level	7
Contact hours	2 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment Strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
History of weed science. Characteristics and effects of weeds. Weed identification and classification. Weed biology and ecology; propagation, growth, seed dormancy. Weed-crop competition, allelopathy, interference. Weed control practices: preventive, mechanical, biological, cultural, chemical, integrated weed management. Herbicides: effect on plants, selectivity, fate in soil, application and safety, regulation, environmental impact. Herbicide resistance.

AACA 3701: FIELD ATTACHMENT I

Module Title:	FIELD ATTACHMENT I
Code	AACA 3701
NQF Level	7
Contact hours	6 weeks
Assessment Strategies	Final assessment 100% (Attachment report and Oral Presentation)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Students will be attached to agricultural enterprises or organisations, such as farms and research stations to participate in physical work and management of operations taking place. Academic staffs will pay field visits to students to discuss with them and their supervising officers on site the knowledge obtained and areas of exposure needing improvement.

ACRS 3781: PLANT BREEDING

Module Title:	PLANT BREEDING
Code	ACRS 3781
NQF Level	7
Contact hours	03 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	12
Prerequisite	AASC 3681 Genetics

Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Aims of plant breeding: Yield improvement, yield stability, biotic and abiotic stress tolerance and resistance, nutritional quality. Germplasm sources and maintenance: importance of genetic diversity, centres of diversity, wild relatives, ex situ and in situ gene banks, CGIAR plant conservation and improvement system, germplasm conservation methods. Plant reproduction mechanisms: inbreeding mechanisms-cleistogamy, flower closure, etc; out breeding mechanisms-dioecy, monoecy, male sterility, incompatibility, sex separation in time; clonally propagated crops. Inbreeding depression, hybrid vigour. Selection theory. Common conventional breeding procedures for inbreeding and out breeding crops—pedigree selection, mass selection, backcrossing, mass selection, simple recurrent selection, selection for hybrid production. Cultivars evaluation. Overview of novel breeding techniques: mutageniesis, haploid and polyploidy plants, somaclonal variation, marker assisted selection and gene transfer.

ACSC 3792: RESEARCH METHODS

Module Title:	RESEARCH METHODS
Code	ACSC 3792
NQF Level	7
Contact hours	03 lecture hours / week for 14 weeks; 3 tutorial hours / practical hours alternate weeks for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	12
Co-requisite	ACRS 3681: BIOSTATISTICS
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Students will be exposed to more advanced statistical concepts and research methods above those covered in Biostatistics. Comparison between parametric and non-parametric statistics. Non-parametric statistics: goodness of fit tests; tests of association, Chi Square tests; paired comparisons, Wilcoxon's tests; rank correlation; Multivariate methods: multiple regression, discriminant analysis, canonical analysis, multidimensional scaling, principal component analysis. Review of experimental designs with emphasis to livestock, crop and game animal experimentation. Review of procedures for implementing research projects and presentation of research results with emphasis to practical field situations and case studies. Introduction to Statistical Computer packages

ACSC 3702: CROP ECOPHYSIOLOGY

Module Title:	CROP ECOPHYSIOLOGY
Code	ACSC 3702
NQF Level	7
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Growth analysis. Factors affecting growth and development: light penetration into crop, amount and quality of light. Factors affecting transpiration. Development, differentiation and yield. Yield components and their limitations: Law of the minimum. Water potential. Water use efficiency. Biological nitrogen fixation. Factors affecting germination, dormancy. Factors affecting root growth and distribution. Factors affecting leaf and stem growth, branching
Flowering. Maturation and ripening. Senescence and abscession. Physiology of stress – abiotic (heat, acidity, water) and biotic stresses.

ACSC 3722: CROP STORAGE AND HANDLING

Module Title:	CROP STORAGE AND HANDLING
Code	ACSC 3722
NQF Level	7
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The Post-harvest system: Post-harvest systems for various crops. Properties of crop commodities: Physical, mechanical and thermal properties of crops which affect their storage and handling. Crop drying. Energy required for drying. Natural drying,

Artificial drying, Psychometrics. Equilibrium moisture relationships, Behaviour of moisture in grain bulk/stacks. Moisture content determination. Moisture metre calibration. Types and maintenance of driers: Safe temperatures for drying.Drying methods. Psychometrics.Types of driers.Types of farm storage structures: Silos, sheds, warehouses and open stacks, bunkers, Management of storage facilities. Stacking and movement of commodities. Storage losses including loss assessment methods. Review of Biology of Storage Pests and Pest Infestation Control.Processing of agricultural crops: Threshing. Shelling. Milling. Threshing and shelling efficiency Oil expression
Rice threshing at Ogongo Handling and storage of horticultural and perishable Crops: Causes of losses e.g. physiological changes, mechanical damage, pests and diseases. Quality assessment. Conservation techniques for horticultural crops.Material handling equipment: Material movement into and within storage structures for large scale structures: Folk lift, Screw conveyor, Belt conveyor, Bucket elevator, Pneumatic conveyor

ACSC 3742: FARM MECHANISATION

Module Title:	FARM MECHANISATION
Code	ACSC 3742
NQF Level	7
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Fundamental quantities and units. Concepts of work, Power and Torque. Animal Power (Hitching, harvesting, capability, training), Machine Power (The Tractor. The internal combustion engine and other sub-systems; Power Trains: Tractor tests and Performance. Operation and maintenance; Safety), Natural Power (Solar, wind). Tillage: Primary tillage; secondary tillage: implement types and their operation. Crop planting, fertilization and weed control: Equipment types and operation, calibration and safety aspects. Crop Harvesting: Objective, combine harvester-types and operation. Farm Machinery Management: Machine capacity, performance and costs. Machinery cost and selection.

FOURTH YEAR MODULES

ACSC 3810: RESEARCH PROJECT

Module Title:	RESEARCH PROJECT
Code	ACSC 3810
NQF Level	8
Contact hours	Equivalent to 1 hour per week for 28 weeks
NQF Credits	32
Pre-requisite	ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content
Senior undergraduate students carry out independent study of a current topic in Agriculture and related fields. The course includes participation in meetings organized by the coordinator, work with a faculty advisor to develop a research project, formulate hypotheses, design and carry out experiments and collect data and test the hypotheses. Students will carry out independent library research, begin experimental work, prepare a written report and make a presentation to other students of the research proposal and a final presentation of the preliminary results. The student will submit a final report written following Guidelines for Scientific Writing.

AACA 3801: FIELD ATTACHMENT II

Module Title:	FIELD ATTACHMENT II
Code	AACA 3801
NQF Level	8
Contact hours	6 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module is designed to further expose students to the realities of farming and agro-industry operations in Namibia. They are expected to observe and participate in different facets of production, processing, marketing, extension and assist with management functions e.g. supervision of general work force and problem solving. Academic staffs will pay field visits to students to discuss with them and their supervising officers on site the knowledge obtained and areas of exposure needing improvement.

ACSC 3841: SEED SCIENCE AND TECHNOLOGY

Module Title:	SEED SCIENCE AND TECHNOLOGY
Code	ACSC 3841

NQF Level	8
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Importance of quality seed for crop production. Review of cultivar development: selection methods, variety evaluation and release. Types of cultivars: purelines, hybrids, synthetics, open pollinated populations. DUS-test. Seed ecology: review of plant growth and seed development: growth factors affecting seed quality. Seed germination and Seed dormancy. Seed multiplication: organization, suitable areas, and agronomy. Harvesting and threshing methods. Processing: drying,cleaning, treatment, grading. Storage:packaging, factors affectingstorage: packaging, factors affecting storage life. Seed quality control: legislation, certification, inspection, testing. Marketing
and distribution: demand forecasting, supply, pricing. Seed production of important crops of Namibia.

ACSC 3861: AGRICULTURAL ENTOMOLOGY

Module Title:	AGRICULTURAL ENTOMOLOGY
Code	ACSC 3861
NQF Level	8
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Effects of insects on crops. Insect structures and life cycles: Body parts, maintenance and locomotion, sensory organs, reproduction. Insect classification economically important insect orders. Grouping of insect in relation to host damage and pest control: chewing insects, piercing and sucking insects. Population dynamics: Economic threshold. Insect sampling techniques: transects, traps, mark-release-recapture. Causes of success of insects. Insect control measures: preventative, chemical, cultural, biological, physical, integrated insect control. History and classification of insecticides: organochlorine insecticides, Organophosphorus insecticides, carbamates, pyrethroids, insecticide resistance. Integrated pest management. Environmental issues related to insecticides: effects on food chain, persistent insecticides, banned insecticides, environmental protection legislation and enforcement. Field pests of horticultural and field crops in Namibia. Pests of stored crops in Namibia.

ACSC 3881: SOIL FERTILITY AND PLANT NUTRITION

Module Title:	SOIL FERTILITY AND PLANT NUTRITION
Code	ACSC 3881
NQF Level	8
Contact hours	03 Lecture hours / week for 14 weeks 02 Practical hours / week for 14 weeks
NQF Credits	12
Pre-requisite	ACRS 3682 Soil Science for Crop Production
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Soil organic matter: carbon cycle, CO2 global warming, bioassay, response to management practices. Review of plant nutrients: macronutrients, micronutirents. . Functions of each nutrients in plant metabolism and growth. Review of basic soil chemistry concepts: soil pH and nutrient availability, soil colloids and cation exchange. Solubility equilibria as applied to nutrient and solubility and movement. Mobility of major nutrients in the soil and in the plant. Salinity: meaning measurement and amendment. Soil acidity and alkalinity and amendment: liming requirements. Fertilizers: nutrients content, solubility, fertilizer formulations, losses; types of fertilizers—single fertilizers, compound fertilizers, Law of the minimum. Soil and plant analysis. Integrated nutrient management. Brief overview of nutrient deficiency symptoms.

ACSC 3892: HORTICULTURE II—Fruit Crops and Ornamental Plants

Module Title:	HORTICULTURE II—Fruit Crops and Ornamental Plants
Code	ACSC 3892
NQF Level	8
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

NQF Credits	12
Pre-requisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Fruit and Nut production: Importance of fruits and nuts to human nutrition and the economy. Plant propagation techniques applicable to fruit species: seed propagation: genetic segregation and disadvantages of seed propagation for fruit and ornamental plants; uniformity, consistent quality and vegetative—stem cuttings, air layering, grafting, in vitro culture plantlets. Specific environmental requirements of fruit trees. Specifics in cultivation systems of fruit trees. Tree nursery management. Main tropical and subtropical fruit species – their propagation, cultivation, harvest and handling. Indigenous fruit species: propagation and adaptation challenges. Stimulants – coffee, tea, cocoa – their propagation, cultivation, harvest and handling. Pollination requirements for some fruit tree species: importance of bees, establishment and maintenance of bee colonies. Fruit and nut harvesting: properties of fruits and nuts in respect to handling and shelf life. Ornamental and landscape plants – most common indoor and outdoor ornamental species – their propagation, cultivation and utilization. Use of plant growth regulators in fruit and ornamental plants.

ACSC 3802: PLANT PATHOLOGY

Module Title:	PLANT PATHOLOGY
Code	ACSC 3802
NQF Level	8
Contact hours	02 Lecture hours / week for 14 weeks 02 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Definition of disease. Life cycles and dispersal of fungi and bacteria. Viruses. Parasite-host interactions: antibiosis. Characteristics of major groups of plant pathogenic fungi, bacteria and viruses. Plant disease epidemiology. Methods for assessing crop losses. Methods of control: agronomic, tolerant or resistant crops and cultivars, fungicides used, seed treatment. Classification of fungicides. Effects of fungicides on environment. Biological control. Costs/benefits of control methods.

ACSC 3822: PLANT BIOTECHNOLOGY

Module Title:	PLANT BIOTECHNOLOGY
Code	ACSC 3822
NQF Level	8
Notional Hours	80
Contact hours	02Lecture hours / week for 14 weeks 02 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)
NQF Credits	8
Pre-requisite	AASC 3681 Genetics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Plant tissue culture – concept of totipotency, culture media composition and environmental conditions. Micro-propagation. Direct and indirect organogenesis and non-zygotic embryogenesis, somaclonal variation and in vitro mutagenesis. Embryo rescue. Protoplast culture and regeneration. Production of haploid plants. Production of secondary metabolites. Cryopreservation. DNA isolation and amplification (PCR). Molecular analysis of DNA, RNA, and proteins. Basics of marker assisted selection. Recombinant DNA. Direct and indirect gene transfer. GMO's and bio-safety: issues relating to bio-safety, international bio-safety protocols, bio-safety legislation and regulation in Namibia.

ACSC 3812: SOIL CONVERSATION AND IRRIGATION

Module Title:	SOIL CONVERSATION AND IRRIGATION
Code	ACSC 3812
NQF Level	8
Notional Hours	80
Contact Hours	04 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
Assessment strategies	Continuous Assessment: 40% (1x assignments + 2 tests + at least 3 marked practicals). Exam: 60% (1 x3 hr paper)
NQF Credits	8
Pre-requisite	ACRS3682: Soil Science and Crop Producation
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Soil conservation: Causes of and types of soil erosion in Namibia. Estimating soil losses (Measurement and Prediction). Erosion and control methods: Agronomic and mechanical control, Gully erosion control and wind erosion control. Soil Conservation Planning. Conservation agriculture. Land evaluation, Topographic Survey; Water Resources; Irrigation: Irrigation Agronomy Crop water requirements; irrigation water requirements, Irrigation Engineering: Planning and irrigation project, choosing an irrigation method. Operation and management of Surface irrigation, sprinkler irrigation and Trickle/drip irrigation. Irrigation scheduling. Alternatives to irrigation (water harvesting). Problem soil management and reclamation. Drainage of irrigated land.

B.SC. AGRICULTURE (FOOD SCIENCE & TECHNOLOGY) HONS [17BSFS]

PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
UCLC 3509	Computer Literacy	5	8	C	
ULCE 3419	English Communication and Study Skills	4	16	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
SBLG 3511	Introduction to Biology	5	16	C	
SPHY 3501	Physics for Life Sciences I	5	8	C	
SMAT 3511	Basic Mathematics	5	16	C	
Total Credits Semester 1					72
Year 1 Semester 2					
ULEA 3519	English for Academic Purposes	5	16	C	
SCHM 3532	Chemistry for Life Sciences	5	16	C	
SPHY 3532	Physics for Life Sciences II	5	16	C	
SBLG 3512	Diversity of Life	5	16	C	
SMAT3512	Pre-calculus	5	16	C	
Total credits Semester 2					80
Total CREDITS YEAR 1					152

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 2 Semester 1					
AAEC 3681	Principles of Microeconomics	6	12	C	None
AAEC 3691	Rural Sociology	6	12	C	None
AASC 3681	Genetics	6	12	C	None
AFST 3681	General Microbiology	6	12	C	None
ACRS 3681	Biostatistics	6	12	C	None
AFST 3691	Post-Harvest Technology	6	12	C	None
AFST 3601	Human Nutrition	6	8	C	None
Total Credits Semester 1					80
Year 2 Semester 2					
AFST 3682	Fruits and Vegetable Technology	6	12	C	None
AFST 3602	Food Technology	6	8	C	None
AASC 3612	Biochemistry	6	16	C	SCHM 3532 (Chemistry for Life Sciences)
AASC 3602	Livestock Production Systems	6	8	C	None
AFST 3692	Food Biotechnology	6	12	C	None
Total credits Semester 2					56
Total CREDITS YEAR 2					136

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 3 Semester 1					
AACA 3701	Field Attachment I	7	8	C	None
AFST 3781	Food Chemistry	7	12	C	ASC 3612

					(Biochemistry)
AFST 3791	Food Microbiology	7	12	C	FST 3681 (General Microbiology)
AFST 3701	Product Development and Sensory Evaluation	7	8	C	None
AFSC 3791	Food Processing Technology	7	12	C	AFST 3602 (Food Technology)
AFSC 3781	Meat Science & Technology	7	12	C	None
Total Credits Semester 1					64
Year 3 Semester 2					
ACSC 3792	Research Methods	7	12	C	ACRS3681 (Biostatistics)
AFST 3702	Food Toxicology	7	8	C	FST 3781 Food Chemistry
AFST 3722	Food Analysis and Instrumentation	7	8	C	None
AAEC 3702	Entrepreneurship	7	8	C	None
AFSC 3782	Principles of Food Engineering	7	12	C	None
AAEC 3782	Agricultural Marketing	7	12	C	None
Total credits Semester 2					60
Total CREDITS YEAR 3					124

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 4 Semester 1					
AACA 3801	Field Attachment II	8	8	C	AACA 3708 (Field Attachment I)
AFST 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AFST 3841	Quality Management Systems	8	8	C	FST 3602 (Food Technology)
AFST 3881	Dairy Science & Technology	8	12	C	FSC 3791 (Food Processing Technology)
AFST 3891	Applied Food Engineering	8	12	C	FSC 3782 Principles of Food Engineering
AFST 3861	Food Packaging, Storage & Distribution	8	8	C	None
Total Credits Semester 1					64
Year 4 Semester 2					
AFST 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AFST 3862	Sea Foods Technology	8	8	C	FST 3602 (Food Technology)
AFST 3882	Cereal Science & Technology	8	12	C	None
AFSC 3802	Edible Fats & Oils Technology	8	8	C	FST 3781 (Food Chemistry)
AAEA 3882	Agric. Business Management	8	12	C	None
AFST 3822	Plant Equipment & Management	8	8	C	FSC 3791 (Food Processing Technology)
Total credits Semester 2					64
Total CREDITS YEAR 4					128
TOTAL CREDITS FOR THE PROGRAMME					540

MODULE DESCRIPTORS

FIRST YEAR MODULES

CLC3509 COMPUTER LITERACY

Module title: COMPUTER LITERACY

Code:	CLC3509
NQF level:	5
Contact hours:	1 lecture theory and 1 lecture practical per week for 14 weeks
Credits:	8
Module assessment:	Continuous Assessment 100%: 2 Practical Tests 50%, 2 Theory Tests 50%
Prerequisites:	University Entry

Module Content:
The module covers the following topics. Introduction to Computers: hardware and software, types and categories of computers, usage of Computer devices and peripherals. Working with the windows operating system: File Management, working with multiple programs, using the recycle bin. Using a word processor: formatting a text and documents, spelling check, grammar and thesaurus tools, inserting tables, auto-shapes, clip arts, charts, and mail merge. Spreadsheet: worksheets and workbooks, ranges, formulas and functions, creating graphs, charts, and printing the workbook. Databases: creating tables, relationships, queries, forms and reports. Presentation software: slide layout and master, animations, auto-content wizard and templates. Communication tools: introduction to the Internet, web browsers, search engines, downloading and uploading files, creating and sending messages, email etiquette, internet security, and digital signatures.

LCE3419 ENGLISH COMMUNICATION & STUDY SKILLS

Module title:	ENGLISH COMMUNICATION AND STUDY SKILLS
Code:	LCE3419
NQF Level:	4
Contact hours:	4 hours per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment (60%): two tests (reading and writing), two reading assignments, one oral presentation, Examination (40%): one three hour examination paper
Pre-requisites:	None

Module Content:
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module title:	CONTEMPORARY SOCIAL ISSUES
Code	CSI 3580
NQF Level	5
Contact hours	Equivalent to 1 hour per week for two semesters (Online)
NQF Credits	8
Prerequisite	None (University Core Module)
Compulsory/Elective	Compulsory
Semester Offered	1 & 2 (Year Module)

Module Descriptor (Rationale of the module):
The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title	INTRODUCTION TO BIOLOGY
Code	SBLG3511
NQF Level	4
Contact hours	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
NQF Credits	16
Module Assessment:	Continuous assessment (40%): Theory (not less than 3 tests and 2 assignments), 40%. Practicals (not less than 10 marked assignment), 60%. Examination (60%): 3 hour examination paper.
Prerequisite	NSCC (Biology C or better)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
It will consider organization of life, chemical basis of life, carbohydrates, proteins, nucleic acids, lipids and fats, water, cell structure and function, prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton, membrane structure and function, cell communication, mitosis, meiosis, cell reproduction, cell cycle, and cell death. The following topics

will be covered: Introduction to systems of classification, taxonomy and binomial nomenclature, including the five kingdoms and the three domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

SPHY 3501: PHYSICS FOR LIFE SCIENCES I

Module title:	PHYSICS FOR LIFE SCIENCES I
Code:	SPHY3501
NQF level:	4
NPSC:	N/A
Contact hours:	28 Lectures and 14 Practical Sessions/Tutorials
Credits:	8
Module assessment:	Continuous Assessment (50%) and 1 x 3-hour Exam Paper (50%). Continuous Assessment will consist of class tests, tutorial tests/assignments and practical reports.
Pre-requisites:	None

Module Content:

This module is to introduce Life science students to physics concepts and applications that will be useful to them in their undergraduate studies and carrier. The course will cover the following topics:
Units and significant figures; Motion in one dimension, average velocity, acceleration, freely falling bodies; Vectors and scalars, addition and subtraction of vectors in one and two dimensions, multiplication of vectors, component method of vector addition; Projectiles; Force and weight, Newton's laws and applications, free-body diagrams, friction, motion on inclined planes; Uniform circular motion, period and frequency of motion, centripetal force, banking of curves; Newton's law of Universal gravitation, gravity near the Earth's surface, satellites; Kepler's laws; Work done by a constant force, kinetic energy, work-energy theorem, potential energy, conservation of Mechanical energy, power; Momentum, impulse, conservation of energy and momentum in collisions, elastic and inelastic collisions in one dimension.

SMAT 3511: BASIC MATHEMATICS

Module Title:	BASIC MATHEMATICS
Code:	SMAT 3511
NQF level:	5
Contact hours:	4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module Content:

Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

LEA3519 ENGLISH FOR ACADEMIC PURPOSES

Module title:	ENGLISH FOR ACADEMIC PURPOSES
Code:	LEA3519
NQF level:	5
Contact hours:	4 periods per week for 14 weeks
Credits:	16
Module assessment:	Continuous assessment (60%): 2 tests (reading and writing), 1 academic written essay,1 oral Presentation; Examination (40%) : One three hour examination paper
Prerequisites:	None

Module Content:

This module develops a student's understanding, and competencies regarding academic conventions such as academic reading, writing, listening and oral presentation skills for academic purposes. Students are required to produce a referenced and researched essay written in formal academic style within the context of their university studies. Students are also required to do oral presentations based on their essays. The reading component of the course deals with academic level texts. This involves students in a detailed critical analysis of such texts. The main aim is therefore, to develop academic literacy in English.

SCHM 3532: CHEMISTRY FOR LIFE SCIENCES

Module Title:	CHEMISTRY FOR LIFE SCIENCES
Code:	SCHM3532
NQF Level:	5
Contact Hours:	56 hours of lectures, 42 hours of practical sessions.
Credits:	16
Module Assessment:	CA: 50% (minimum 3 tests 80%, laboratory component 20%, tutorial assignments 10%). Final

Exam: 50%; (1 x 3 hour exam paper)

Pre-requisites: None

Module Content:

Classification of Matter: Mixtures and Pure substances; Physical States of Matter; Physical and Chemical Properties. Extensive and Intensive properties.

Measurements: Units, Significant figures; Precision and Accuracy, Factor Label Method. Atomic structure and the Periodic table; Electron configuration; Physical and Chemical properties as predicted from groups. Ionic compounds and Molecular compounds: Writing chemical formulae and naming of ionic and molecular compounds. Average Atomic Mass. The Mole Concept; Percent Composition, Empirical formula and Molecular formula. Stoichiometry: limiting reagent, percent yield. Solutions: electrolytes and non-electrolytes, aqueous solutions, ionic equations; concentrations: percent concentration; molarity, molality; dilution of solutions; structure and solubility. Types of bonds; Lewis structures; Resonance structures; Molecular geometry: the VSEPR model, Polarity of molecules. Acid-base equilibrium: properties of acids and bases; relations of acids and bases, self ionisation of water; strengths of acids and bases; the pH scale; hydrolysis of salts; buffers; acid-base titration. Introduction to organic chemistry: organic compounds; structural formulae and conformations; functional groups; Classes of hydrocarbons: alkanes, cycloalkanes: alkanes; alkenes and alkynes; oxidation and reduction; addition reactions; stereo-isomerism. Alcohols, phenols, thiols, ethers: organic compounds of oxygen; common alcohols and phenols. Carboxylic acids and esters, amines and amides: Introduction to carbohydrates, lipids and porphyrins.

SPHY 3532: PHYSICS FOR LIFE SCIENCES II

Module Title: PHYSICS FOR LIFE SCIENCES II
Code: SPHY 3532
NQF Level: 4
Contact Hours: 4 Lectures per week for 14 weeks, Practical Time: 14 sessions (42 hours)
Credits: 16
Module assessment: Continuous assessment (50%, Minimum 2 tests, 4 assignments and practical reports) and Examination (50%,1 x 3-hour paper)
Pre-requisites: NSSC Physical Science
Co-Requisites: SPHY 3401: Physics for Life Sciences I; SMAT3511: Basic Mathematics; SMAT3512: Pre-calculus;

Module Content:

This module introduces life science students to concepts of physics and their application to real life situations, new topics that were not dealt with in PHY 3101 are introduced (i.e., on electricity, magnetism and radioactivity). The content of this course is good enough to help the life science students throughout their undergraduate work and careers. The following topics will also be covered: Electric charge; insulators and conductors; Electric force and coulomb's law , Electric field and Gauss's law; Electric potential; Capacitance and capacitors; Direct current; Ohm's law and simple circuits; Magnetic field; Alternating current; Transformers; Phenomenological approach to RL and RC circuits; Temperature, gas and thermal expansion; Basic geometrical optics; Radioactivity and its detection.

SBLG3512: DIVERSITY OF LIFE

Module title: DIVERSITY OF LIFE
Code: SBLG 3512
Course Equivalent: NSSC (/HIGH GRADE) Biology
NQF level: 5
Contact hours: 4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits: 16
Module assessment: Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites: NSCC (Biology C or better)

Module Content:

This module is designed to give students a detailed understanding of the diversity of life. It gives students the broader appreciation of biodiversity in the different ecological habitats. The course shall describe diagnostic characteristics of principle taxonomic categories for each phylum. Coverage of each Phylum shall follow a phylogenetic (evolutionary) approach as well as introduce broad ecological and physiological principles. Various aspects of reproduction and development shall be highlighted. This module prepares students to understand subsequent courses such as Introduction to Ecology and Microbiology, Population Ecology, Comparative physiology, Biogeography, Plant and Animal Form and Function

Topics covered will include viral, bacterial, fungal, algal, animal and plant diversity. It then considers the characteristics and life cycles of the following important algae, animal and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrrophyta, Cryptophyta, Protostomate phyla: Nemertea, Mollusca, Anellida, Arthropoda, Nematoda, Rotifera, Lophophorates, Onychophora. Deuterostomate phyla: Echinodermata, Hemichordata and Chordata (Subphyla: Urochordata, Cephalochordata and Vertebrata: Class Myxiniformes, Petromyzontiformes, Placoderms, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.

Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field.

(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SMAT 3512: PRE-CALCULUS

Module Title: PRE-CALCULUS
Code: SMAT 3512

NQF level:	5
Contact hours:	4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module Content:
Functions: one-to-one and onto functions, horizontal line test, composition of functions, inverse of a function. Introduction to exponential and logarithmic functions. Limit of a function: definition, left and right limits, infinite limits, limits at infinity, continuity in terms of limits. Differentiation: rate of change, derivative of a function, rules of differentiation, increasing and decreasing functions and graph sketching. Integration: antiderivatives, the definite integral, area under a graph. Trigonometry: further trigonometric identities, area of a sector and segment of a circle, derivatives and integrals of trigonometric functions.
(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SECOND YEAR MODULES

AFST3691: POST HARVEST TECHNOLOGY

Module Title:	POST HARVEST TECHNOLOGY
Code	AFST3691
NQF Level	6
NQF Credits	12
Contact hours	Three Lecture hours / week for 14 weeks; 03Practical hours / week for alternating weeks. Duration of 14 weeks.
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Exam: 60% (1 x 3 hr paper).
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course includes issues such as postharvest losses; physiological and biochemical characteristics of agricultural products with respect to maturation, ripening and storage life; respiration and is factors affecting respiration rates in selected agricultural crops; controlled atmosphere storage (CAS) and modified atmosphere packaging (MAP); postharvest treatments; postharvest handling, drying and storage of selected crops; pest control and fumigation, and other factors influencing quality. This course develops the students understanding of the ethics and practices employed in food processing. In addition, students are given an understanding of food preservation techniques and factors that affect food quality and shelf life.

AFST 3681: GENERAL MICROBIOLOGY

Module Title:	GENERAL MICROBIOLOGY
Code	AFST 3681
NQF Level	6
NQF Credits	12
Contact hours	Three Lecture hours / week for 14 weeks; 03 Practical hours / week for alternating weeks. Duration of 14 weeks.
Assessment Strategies	Continuous Assessment 40% (minimum 2 tests, 2 assignments and 4 practicals). Examination: 60% (1 x 2hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
This course provides students with a general overview of microbiology, their environment, classifications, their morphology, structures and chemical composition. The biology of bacteria, fungi, algae, protozoa and viruses. Effect of antibiotics on microorganisms, important pathogens of plants and animals. The role of microorganisms in nature; in biogeochemical cycles, in general industries, food industries and in the soils. Concept of microbiology with special reference to microscopy, staining procedure, sterilization, aseptic, pure culture techniques and media preparation.

AFST 3601: HUMAN NUTRITION

Module Title:	HUMAN NUTRITION
Code	AFST 3601
NQF Level	6
Contact hours	Two Lecture hours / week for 14 weeks; 03 Practical hours / week for alternating weeks. Duration of 14 weeks.
Assessment Strategies	Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals). Exam: 60% (1 x2hr paper)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered 2

Module Content:
This course gives students an overview of the locally available foods in Namibia and SADC region, basic nutritional aspects, food digestion system and fluctuations of nutrients in the body. Topics include Students anthropometric measurements: Body Mass Index (BMI), Basal Metabolic Rate (BMR) and Physical Activity Level (PAL); nutritional disorders resulting from deficiencies and excesses e.g. Blindness, Marasmus, Kwashiorkor and Obesity and other macronutrient deficiencies such as Rickets and Anaemia. Balanced ration for each group of people. Students will acquire knowledge in the areas of preservation of nutrients, processing, packaging, GMPs & HACCP, food laws, food toxicology, intolerances and allergies. The role of nutrition with respect to HIV/AIDS will be covered.

AFST 3682: FRUITS AND VEGETABLES TECHNOLOGY

Module Title:	FRUITS AND VEGETABLES TECHNOLOGY
Code:	AFST 3682
NQF Level	6
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hrs practicals every two week. Duration of 14 weeks.
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Students acquaint themselves with types of fruits and vegetables, their definitions, differences, uses, nutrition and economic importance including structure, composition and maturation of fruits and vegetables. They also analyse quality, handling procedures in order to extend shelf life of fresh produces and processed products. Students also learn processing and preservation of juices, concentrates, carbonated beverages, fermentation of wines, ciders, pickles, sauerkraut and drying, freezing, canning techniques. They evaluate quality and shelf life of processed fruits and vegetable products including packaging and labeling. They learn how to apply good manufacturing practices (GMPs) and Hazard analysis critical control points (HACCP).

AFST 3602: FOOD TECHNOLOGY

Module Title:	FOOD TECHNOLOGY
Code	AFST 3602
NQF Level	6
NQF Credits	8
Contact hours	Two hours of lectures per week, three hours practicals every two week. Duration of 14 weeks.
Assessment strategies	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Exam: 60% (1 x 2hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
This course will introduce students to food industry in Namibia and SADC region on principles of food handling; food processing and preservation; food packaging and labeling. Impact of food technology on traditional foods and diet; influence of food technology on the culture and civilization of food consumption in Namibia; implications of population growth on the advancement of food technology. Food laws and quality management systems.

AFST 3692: FOOD BIOTECHNOLOGY

Module Title:	FOOD BIOTECHNOLOGY
Code	AFST 3692
NQF Level	7
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks.
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 3 hour paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course includes topics such as Food biotechnology, an overview; importance, advances, trends and implications. Genetic engineering techniques; restriction enzymes, DNA cloning-cell transformation and transfection, Enzyme engineering and immobilization techniques. Downstream processing, Fermentations. Scale up operations. Biosafety risk assessment and risk management.

THIRD YEAR MODULES

AACA3701: FIELD ATTACHMENT 1

Module Title:	FIELD ATTACHMENT 1
Code	AACA3701
NQF level	7
NQF credits	8
Contact hours	
Assessment strategies:	Final assessment 100% (Attachment report and oral presentation).
Prerequisite	None
Compulsory/elective	Compulsory
Semester offered	1

Module Content:
The module is designed to expose students to practical experience of actual operations on food-industries research and quality assurance institution. It enables students to observe and participate in food processing, quality control and management of operations.

AFST 3781: FOOD CHEMISTRY

Module Title:	FOOD CHEMISTRY
Code	AFST 3781
NQF Level	7
NQF Credits	12
Contact hours	Three hours of lectures per week, three hours practicals every two week. Duration of 14 weeks.
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Exam: 60% (1 x 2hr paper)
Prerequisite	Biochemistry AASC 3612:
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course is intended to provide students with knowledge on water chemistry in food processing and technology. The chemistry of important carbohydrates in foods: monosaccharides, oligosaccharides, polysaccharides, related compounds and sensory properties. Amino acid and protein chemistry in foods: Sensory properties of amino acids and protein. Animal and plant proteins: Texturised proteins. Lipid chemistry as applied to foods: free fatty acids, fats, glycerides phospholipids, glycolipids, waxes and cutins. Emulsions, emulsifiers and Flavour reversion. The role of minerals in foods and food processing. Major minerals and trace elements in food processing. The fat-soluble vitamins and water-soluble vitamins in foods and food processing. Aroma compounds; Food tastes and off-flavours. Nature, function and utilization of enzymes in food industry. Food additives including flavour enhancers; colouring agents; sugars and sweeteners; antioxidants. Surface-active agents; Thickening agents; Humectants; Anti-caking agents; Bleaching agents; Clarifying agents; Propellants and protective gases. Food texture, texture profile and measurement.

AFST 3791: FOOD MICROBIOLOGY

Module Title:	FOOD MICROBIOLOGY
Code	AFST 3791
NQF Level	7
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 1 assignment and 3 practicals). Exam: 60% (1 x 2hr paper)
Prerequisite	General Microbiology AFST 3681:
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course is intended to provide students with in depth knowledge on microorganisms of interest in food. The laboratory techniques used in the isolation, enumeration and identification of microorganisms in food. Kinetics of multiplication of microorganisms. Microbiological principles of food processing and preservation. Food poisoning and intoxication. Sampling and sampling plans. Indices of sanitation in food. Biochemical reactions of microorganisms in food.

AFST 3701: PRODUCT DEVELOPMENT AND SENSORY EVALUATION

Module Title:	PRODUCT DEVELOPMENT AND SENSORY EVALUATION
Code	AFST 3701
NQF Level	7
Notional Hours	80
NQF Credits	8
Contact hours	Two hours of lectures per week, three hours practicals every two week. Duration of 14 weeks.
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course includes key concepts such as the process of product development, legislation and labeling of food products. Marketing issues relating to the identification of product niche markets and product criteria, market research, evaluation and trends are also covered. Further, the application of problem diagnosis for product refinement is covered. With regard to sensory evaluation, topics covered include physiological and psychological foundations, senses, scales and ratings, time-intensity scaling. Also included are: application of sensory evaluation, types of panels, types of tests and their specific functions when conducting statistical analysis and during interpretation of data, and the application of a SACCP system.

AFST 3791:	FOOD PROCESSING TECHNOLOGY
Module Title:	FOOD PROCESSING TECHNOLOGY
Code	AFST 3791
NQF Level	7
NQF Credits	12
Contact hours	Two hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks.
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination60% (1 x 2 hour paper)
Prerequisite	AFST 3602 Food Technology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course includes issues such as handling of raw materials, food preparation processes e.g. size reduction, extrusion, preservation techniques e.g. pasteurization, sterilization, refrigeration, dehydration.

AFSC 3781:	MEAT SCIENCE AND TECHNOLOGY
Module Title:	MEAT SCIENCE AND TECHNOLOGY
Code	AFSC 3781
NQF Level	7
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)
Prerequisite	AFST 3602: Food Technology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course is intended to provide students with knowledge on meat industry in Namibia and the SADC region. Structure and composition of meat. Meat proteins and their functionality. Handling of slaughter animals. Slaughtering techniques. Selected topics related to animal anatomy. Grading and pricing of carcasses. Slaughterhouse hygiene. Carcass composition and characteristics and meat quality. Wholesale and retail of meat cuts. Meat processing, equipment and handling: meat packaging, meatstorage, chilling of meat, freezing of meat, smoking of meat, curing of meat, luncheon meats, sausages, sausage casings, meat fermentation. Quality factors and shelf life of processed meat products.

AFST 3702:	FOOD TOXICOLOGY
Module Title:	FOOD TOXICOLOGY
Code	AFST 3702
NQF Level	7
NQF Credits	8
Contact hours	Two lecture hours / week for 14 weeks; 03 practical hours alternate weeks for 14 weeks.
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)
Prerequisite	FST 3781 Food Chemistry
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This course includes issues such as types of toxicity, toxicity measurements, biochemical aspects of toxicity, natural toxic constituents of foods, food spoilage and food borne diseases, manifestations of toxic effects and their remedies, food plant sanitation and hygiene, food inspection and legislation in Namibia.

AFST 3722:	FOOD ANALYSIS AND INSTRUMENTATION
Module Title:	FOOD ANALYSIS AND INSTRUMENTATION
Code	AFST 3722
NQF Level	7
NQF Credits	8
Contact hours	Two lecture hours / week for 14 weeks; 03 practical hours alternate weeks for 14 weeks.

Assessment strategies: Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)
Prerequisite Food Chemistry AFST 3781
Compulsory/Elective Compulsory
Semester Offered 2

Module Content:
This course builds on concepts and principles of providing students with skills and dispositions regarding food analysis and instrumentation. Key concepts covered in the module include the scope of food analysis, analytical methods and procedures, assessment and validation of analytical data. The course explores issues on the importance of precision, accuracy, sensitivity, specificity, standard deviation, co-efficient of variation, good laboratory practice and quality assurance, health and safety when conducting food analysis. The module exposes the student to concepts and theories of AOAC, conventional analytical methods; analytical techniques: titrimetry, gravimetry; separation techniques: chromatography, electrophoresis; introduction to analytical spectroscopy: atomic spectroscopy, molecular spectroscopy and radiochemical methods.

AFSC 3782: PRINCIPLES OF FOOD ENGINEERING

Module Title: PRINCIPLES OF FOOD ENGINEERING
Code AFSC 3782
NQF Level 7
NQF Credits 12
Contact Hours Three hours lectures per week for 14 weeks; 03 hours practical alternate week for 14 weeks.
Assessment Strategies: Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)
Prerequisite None
Compulsory/Elective Compulsory
Semester Offered 2

Module Content:
This course covers: dimensions and units, unit operation calculations, heat and mass balance, heat and mass transfer, heat exchangers, fluid dynamics, rheology, psychrometrics and refrigeration calculations.

FOURTH YEAR MODULES

AFST 3810: RESEARCH PROJECT

Module Title: RESEARCH PROJECT
Code AFST 3810
NQF Level 8
NQF Credits 16
Contact Hours Equivalent to 1 hour per week for 14 weeks.
Assessment Strategies: Oral Presentations 20% (10% x 2 presentations) Project Write-up80%
Prerequisite ACSC 3792: Research Methods
Compulsory/Elective Compulsory
Semester Offered 1

Module Content:
The course includes writing of research proposal in Food Science and Technology field, carrying out research under supervision of lecturer, analyzing data and report presentation and research project write-up.

AACA 3801: FIELD ATTACHMENT II

Module Title: FIELD ATTACHMENT II
Code AACA 3801
NQF Level 8
NQF Credits 6
Contact hours None
Assessment strategies: Final assessment 100% (Attachment report, oral presentations, and confidential reports by field supervisors).
Prerequisite AACA3701: Field Attachment I
Compulsory/Elective Compulsory
Semester Offered 1

Module Content:
The module is designed to expose students to practical experience of actual operations in food industries and research institutions. It enables students to observe and participate in food processing, management of operations and quality control.

AFST 3841: QUALITY MANAGEMENT SYSTEMS

Module Title: QUALITY MANAGEMENT SYSTEMS
Code AFST 3841
NQF Level 8
NQF Credits 8
Contact hours Two lectures per week for 14 weeks
Assessment Strategies: Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Prerequisite	AFST 3602: Food Technology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course is intended to provide students with knowledge on the basic principles of quality management; Good Manufacturing Practices (GMPs); Food Safety; Food Hygiene and Sanitation; Food laws and regulations; Codex Alimentarius; Hazard Analysis Critical Control Point (HACCP); ISO 9001:2000, ISO 22000, ISO/IEC 17025, ISO 14 001; World Organization for Animal Health (OIE) and World Organization for Plant Health. Cleaner productions and food risk assessment and/or analysis.

AFST 3881: DAIRY SCIENCE AND TECHNOLOGY

Module Title:	DAIRY SCIENCE AND TECHNOLOGY
Code	AFST 3881
NQF Level	8
NQF Credits	12
Contact hours	Three lectures per week for 14 weeks; 03 hours Practical every alternate week for 14 weeks.
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper).
Prerequisite	Food Processing Technology (AFSC 3791); Food Microbiology (AFST 3791)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Students acquaint themselves with the knowledge of udder anatomy, milk synthesis, secretion, milk let down assisted by hormones (oxytocin and adrenalin), clean production, collection, transportation, preservation and quality assessment (chemical, physical and microbiological). They also learn how to process milk into various products, handling, packaging, storage, quality assurance and distribution of pasteurized milks (toned, recombined and reconstituted milks), cream, butter, fermented milk products, cheeses, ice cream, condensed/evaporated milk and milk powders. Marketing aspects of milk and dairy products are included.

AFST 3891: APPLIED FOOD ENGINEERING

Module Title:	APPLIED FOOD ENGINEERING
Code	AFST 3891
NQF Level	8
NQF Credits	12
Contact hours	Three lectures per week for 14 weeks; 03 hour Practical every alternate week for 14 weeks.
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course includes: Applied aspects of process and auxiliary equipment selection and operation of equipment for heating, cooling, pressure and vacuum development and fluid transport. Basic aspects of process control are also covered as well as advanced preservation technologies. Emerging Food Engineering technologies are discussed as well as their implication on future food processing. Aspects of computer modeling in food technology are covered.

AFST 3861: FOOD PACKAGING, STORAGE AND DISTRIBUTION

Module Title:	FOOD PACKAGING, STORAGE AND DISTRIBUTION
Code	AFST 3861
NQF Level	8
NQF Credits	8
Contact hours	Two lectures per week for 14 weeks; 03 hours Practical for 3 hours every alternate week for 14 weeks.
Assessment strategies	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practical). Examination: 60% (1 x 2hr paper).
Prerequisite	AFST 3602 Food Technology; AFST 3791 Post Harvest Technology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Students will acquaint themselves with essentials and importance of packaging, functions of packaging, types of packaging, methods of manufacturing packaging materials, their chemical and physical effects on food. They also learn the properties of packaging materials such as permeability to water, air and microbes including methods of prevention such as lamination and lacquering of packaging materials, shelf life and storage of packaging materials. They are also taught new packaging technologies to prevent food spoilage; aseptic packaging, free oxygen scavenging packaging, types of oxygen absorbers, gas-exchange packaging, vacuum packaging, alcohol generating agent, labeling and distribution of products.

AFST 3862: SEA FOODS TECHNOLOGY

Module Title:	SEA FOODS TECHNOLOGY

Code	AFST 3862
NQF Level	8
NQF Credits	8
Contact hours	Two lectures per week for 14 weeks; 03 hours Practical for every alternate week for 14 weeks.
Assessment strategies:	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)
Prerequisite	AFST 3602 Food technology
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This course covers the fishing industry in Namibia and the concepts and principles involved in Fish-catching technology. The course focuses on the composition and chemistry of seafood components. The course exposes the students to the concepts and theories involved in processing surimi from fatty fish, Fish protein hydrolysates/ concentrates, Fish-meal and Fish-oil. Seafood processing by-products will also be covered. The course focuses on the Quality of seafoods e.g. freshness quality of seafoods, the uses of sensory assessment of fish and Seafoods and preservation of seafood quality. The topics of microbiological quality of seafoods e.g. virus, bacteria and parasites and marine toxins will be covered. Students are further exposed to principles and applications of Quality control and management in seafood.

AFST 3882: CEREAL SCIENCE AND TECHNOLOGY

Module Title:	CEREAL SCIENCE AND TECHNOLOGY
Code	AFST 3882
NQF Level	8
NQF Credits	12
Contact hours	Three lectures per week for 14 weeks; 03 hours Practical for every alternate week for 14 weeks.
Assessment strategies	Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2 hr paper).
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
This course focuses on the types of cereals, their differences, uses and economic importance. The Physico-chemical composition and nutritional value of cereals grains are explored. Key concepts of quality assessment of cereal grains, grain handling and storage are covered in this course. Students are exposed to principles and applications involved in milling of different cereals e.g. Dry milling of maize, wet milling of maize, milling of wheat and milling of rice. The issues of flour quality, starch and its uses will be covered. These concepts are applied to the rheology of wheat flour dough and processing and characterization of cereal products. The course exposes the student to concepts involved in Baking technology e.g. bread, cakes, and biscuits; Breakfast cereals e.g. cornflakes, weetabix, puff products; Pasta Products e.g. spaghetti, macaroni and noodles. Key concepts, theories and applications in Brewing technology e.g. malting, malt milling, yeast growth kinetics, fermenter design, wort preparation and fermentation to beer, beer ageing and Quality assurance and control will be covered.

AFSC 3802: EDIBLE FATS AND OILS TECHNOLOGY

Module Title:	EDIBLE FATS AND OILS TECHNOLOGY
Code	AFSC 3802
NQF Level	8
NQF Credits	8
Contact hours	Three lectures per week for 14 weeks; 03 hours Practical for every alternate week for 14 weeks.
Assessment Strategies	Continuous assessment 40% (minimum 2 tests, 1 assignment and 4 marked practicals) Examination 60% (1 x 2 hour paper)
Prerequisite	AFST 3781: Food Chemistry
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
The module includes a comprehensive Lipid chemistry review including the structure of common chemical reactions and simple physical properties. The module exposes the student to concepts and theories of seed decortications and simple decorticators, graters, pulverisers, heaters, roasters, expellers and presses. The issues relating to establishing a small scale and commercial extraction of fats and oils, Oil refinery, Oil storage and packaging will be covered. The module also focuses on the importance of Shelf life, Side reactions during processing and food preparation. The module introduces students to Oil products e.g. cooking oil, margarine, lard, butter and salad oils. Product utilization and quality control is explored in this module.

FST 3822: PLANT EQUIPMENT AND MANAGEMENT

Module Title:	PLANT EQUIPMENT AND MANAGEMENT
Code	FST 3822
NQF Level	8
NQF Credits	8
Contact hours	Two lecture hours per week for 14 weeks; 03hours Practical every alternate week for 14 weeks.
Assessment Strategies:	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)
Prerequisite	None

Compulsory/Elective Compulsory
Semester Offered 2

Module Content:
The course includes: food processing plant layout, water/ waste water treatment, electrical power installation and safety, steam generation and utilization, Plant maintenance, plant records and accounts.

B.SC. FISHERIES AND AQUATIC SCIENCES (HONS) [17BSFA]

PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
UCLC 3509	Computer Literacy	5	8	C	
ULCE 3419	English Communication and Study Skills	4	16	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
SBLG 3511	Introduction to Biology	5	16	C	
SPHY 3501	Physics for Life Sciences I	5	8	C	
SMAT 3511	Basic Mathematics	5	16	C	
Total Credits Semester 1					72
Year 1 Semester 2					
ULEA 3519	English for Academic Purposes	5	16	C	
SCHM 3532	Chemistry for Life Sciences	5	16	C	
SBLG 3512	Diversity of Life	5	16	C	
SMAT3512	Pre-calculus	5	16	C	
Total credits Semester 2					64
Total CREDITS YEAR 1					136

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 2 Semester 1					
AAEC 3681	Principles of Microeconomics	6	12	C	None
AAEC 3691	Rural Sociology	6	12	C	None
AASC 3681	Genetics	6	12	C	None
AFST 3681	General Microbiology	6	12	C	None
ACRS 3681	Biostatistics	6	12	C	None
AFAS 3691	Aquatic Ecology	6	12	C	None
Total Credits Semester 1					72
Year 2 Semester 2					
AAEC 3682	Production Economics	6	12	C	None
AFAS 3682	Introduction to Aquaculture	6	12	C	None
AFAS 3601	Ichthyology I	6	8	C	None
AASC 3612	Biochemistry	6	16	C	SCHM 3532 (Chemistry for Life Sciences)
AFAS 3692	Aquatic Chemistry	6	12	C	None
AFAN 3682	Natural Resource Economics	6	12	C	None
Total credits Semester 2					72
Total CREDITS YEAR 2					144

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 3 Semester 1					
AACA 3701	Field Attachment I	7	8	C	None
AFAP 3781	Physical Oceanography	7	12	C	None
AFAS 3781	Aquaculture and Fisheries products	7	12	C	None
AFAF 3781	Ichthyology II	7	12	C	AFAS 3682: Introduction to

					Aquaculture and AFAS 3602: Ichthyology I
AFAS 3791	Fisheries Management I	7	12	C	None
AAEC 3781	Farm Planning and Management	7	12	C	None
Total Credits Semester 1					68
Year 3 Semester 2					
ACSC 3792	Research Methods	7	12	C	ACRS3681 (Biostatistics)
AFAS 3782	Basic Aquaculture Engineering	7	12	C	AFAS 3682: Intro to Aquaculture, AFAS3692: Aquatic Chemistry, AFAS3691: Aquatic Ecology and AFAS 3602: Ichthyology I
AFAS 3792	Fisheries Management II	7	12	C	None
AFAS 3712	Integrated Coastal Zone Management	7	16	C	AFAS 3691: Aquatic Ecology
AFAA 3782	Aquaculture Nutrition and Feed Manufacturing	7	12	C	None
Total credits Semester 2					64
Total CREDITS YEAR 3					132

Course Code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	**(**Co-requisite) / Pre-requisite
Year 4 Semester 1					
AACA 3801	Field Attachment II	8	8	C	AACA 3708 (Field Attachment I)
AFAS 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AFAS 3812	Fish Population Dynamics	8	16	C	ACSC 3792: Research Methods
AFAS 3832	Aquaculture Management	8	16	C	AFAS: 3682: Introduction to Aquaculture, AFAS 3782 : Basic Aquaculture Engineering and AFAA 3782: Aquaculture Nutrition and Feed Manufacturing
AFAS 3831	Fish Pathology	8	16	C	AFST 3681 General Microbiology and AFAS 3682: Introduction to Aquaculture
AFAS 3891	Fisheries Economics	8	12	C	AFAN 3682: Natural Resource Economics
Total Credits Semester 1					84
Year 4 Semester 2					
AFAS 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AFAS 3811	Biological Oceanography	8	16	C	AFAS 3781 Physical Oceanography, and FAS 3692 Aquatic Chemistry
AENE 3882	Environmental Impact Assessment	8	12	C	AFAS 3712: Integrated

					Coastal Zone Management
Total credits Semester 2					44
Total CREDITS YEAR 4					128
TOTAL CREDITS FOR THE PROGRAMME					540

MODULE DESCRIPTORS

FIRST YEAR MODULES

CLC3509 COMPUTER LITERACY

Module title: COMPUTER LITERACY
Code: CLC3509
NQF level: 5
Contact hours: 1 lecture theory and 1 lecture practical per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: 2 Practical Tests 50%, 2 Theory Tests 50%
Prerequisites: University Entry

Module Content:
The module covers the following topics. Introduction to Computers: hardware and software, types and categories of computers, usage of Computer devices and peripherals. Working with the windows operating system: File Management, working with multiple programs, using the recycle bin. Using a word processor: formatting a text and documents, spelling check, grammar and thesaurus tools, inserting tables, auto-shapes, clip arts, charts, and mail merge. Spreadsheet: worksheets and workbooks, ranges, formulas and functions, creating graphs, charts, and printing the workbook. Databases: creating tables, relationships, queries, forms and reports. Presentation software: slide layout and master, animations, auto-content wizard and templates. Communication tools: introduction to the Internet, web browsers, search engines, downloading and uploading files, creating and sending messages, email etiquette, internet security, and digital signatures.

LCE3419 ENGLISH COMMUNICATION & STUDY SKILLS

Module title: ENGLISH COMMUNICATION AND STUDY SKILLS
Code: LCE3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): two tests (reading and writing), two reading assignments, one oral presentation, Examination (40%): one three hour examination paper
Pre-requisites: None

Module Content:
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module title: CONTEMPORARY SOCIAL ISSUES
Code CSI 3580
NQF Level 5
Contact hours Equivalent to 1 hour per week for two semesters (Online)
NQF Credits 8
Prerequisite None (University Core Module)
Compulsory/Elective Compulsory
Semester Offered 1 & 2 (Year Module)

Module Descriptor (Rationale of the module):
The module, Contemporary Social Issues (CSI3580), is designed to encourage behavioural change among UNAM students and inculcate the primacy of moral reasoning in their social relations and their academic lives. In providing students with critical and analytical thinking the module enables students to grow and develop into well rounded citizens, capable of solving contemporary social challenges experienced in their communities and societies. The teaching of the module takes three dimensions: the intellectual, the professional and the personal dimensions. The intellectual dimension is fostered through engaging students with subject knowledge, independent learning and module assessment. The professional dimension, on the other hand, is fostered through exposing students to real life situations of case studies and practical exercises that draws attention to social issues that attract ongoing political, public and media attention and/or debate. Finally, the professional dimension is fostered through group work, online discussions and class participation

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title INTRODUCTION TO BIOLOGY

Code	SBLG3511
NQF Level	4
Contact hours	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
NQF Credits	16
Module Assessment:	Continuous assessment (40%): Theory (not less than 3 tests and 2 assignments), 40%. Practicals (not less than 10 marked assignment), 60%. Examination (60%): 3 hour examination paper.
Prerequisite	NSCC (Biology C or better)
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
It will consider organization of life, chemical basis of life, carbohydrates, proteins, nucleic acids, lipids and fats, water, cell structure and function, prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton, membrane structure and function, cell communication, mitosis, meiosis, cell reproduction, cell cycle, and cell death. The following topics will be covered: Introduction to systems of classification, taxonomy and binomial nomenclature, including the five kingdoms and the three domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

SPHY 3501: PHYSICS FOR LIFE SCIENCES I

Module title:	PHYSICS FOR LIFE SCIENCES I
Code:	SPHY3501
NQF level:	4
NPSC:	N/A
Contact hours:	28 Lectures and 14 Practical Sessions/Tutorials
Credits:	8
Module assessment:	Continuous Assessment (50%) and 1 x 3-hour Exam Paper (50%). Continuous Assessment will consist of class tests, tutorial tests/assignments and practical reports.
Pre-requisites:	None

Module Content:
This module is to introduce Life science students to physics concepts and applications that will be useful to them in their undergraduate studies and carrier. The course will cover the following topics:
Units and significant figures; Motion in one dimension, average velocity, acceleration, freely falling bodies; Vectors and scalars, addition and subtraction of vectors in one and two dimensions, multiplication of vectors, component method of vector addition; Projectiles; Force and weight, Newton's laws and applications, free-body diagrams, friction, motion on inclined planes; Uniform circular motion, period and frequency of motion, centripetal force, banking of curves; Newton's law of Universal gravitation, gravity near the Earth's surface, satellites; Kepler's laws; Work done by a constant force, kinetic energy, work-energy theorem, potential energy, conservation of Mechanical energy, power; Momentum, impulse, conservation of energy and momentum in collisions, elastic and inelastic collisions in one dimension.

SMAT 3511: BASIC MATHEMATICS

Module Title:	BASIC MATHEMATICS
Code:	SMAT 3511
NQF level:	5
Contact hours:	4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits:	16
Module Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module Content:
Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

LEA3519 ENGLISH FOR ACADEMIC PURPOSES

Module title:	ENGLISH FOR ACADEMIC PURPOSES
Code:	LEA3519
NQF level:	5
Contact hours:	4 periods per week for 14 weeks
Credits:	16
Module assessment:	Continuous assessment (60%): 2 tests (reading and writing), 1 academic written essay,1 oral Presentation; Examination (40%) : One three hour examination paper
Prerequisites:	None

Module Content:

This module develops a student's understanding, and competencies regarding academic conventions such as academic reading, writing, listening and oral presentation skills for academic purposes. Students are required to produce a referenced and researched essay written in formal academic style within the context of their university studies. Students are also required to do oral presentations based on their essays. The reading component of the course deals with academic level texts. This involves students in a detailed critical analysis of such texts. The main aim is therefore, to develop academic literacy in English.

SCHM 3532: CHEMISTRY FOR LIFE SCIENCES

Module Title: CHEMISTRY FOR LIFE SCIENCES
Code: SCHM3532
NQF Level: 5
Contact Hours: 56 hours of lectures, 42 hours of practical sessions.
Credits: 16
Module Assessment: CA: 50% (minimum 3 tests 80%, laboratory component 20%, tutorial assignments 10%). Final Exam: 50%; (1 x 3 hour exam paper)
Pre-requisites: None

Module Content:
Classification of Matter: Mixtures and Pure substances; Physical States of Matter; Physical and Chemical Properties. Extensive and Intensive properties.
Measurements: Units, Significant figures; Precision and Accuracy, Factor Label Method. Atomic structure and the Periodic table; Electron configuration; Physical and Chemical properties as predicted from groups. Ionic compounds and Molecular compounds: Writing chemical formulae and naming of ionic and molecular compounds. Average Atomic Mass. The Mole Concept; Percent Composition, Empirical formula and Molecular formula. Stoichiometry: limiting reagent, percent yield. Solutions: electrolytes and non-electrolytes, aqueous solutions, ionic equations; concentrations: percent concentration; molarity, molality; dilution of solutions; structure and solubility. Types of bonds; Lewis structures; Resonance structures; Molecular geometry: the VSEPR model, Polarity of molecules. Acid-base equilibrium: properties of acids and bases; relations of acids and bases, self ionisation of water; strengths of acids and bases; the pH scale; hydrolysis of salts; buffers; acid-base titration. Introduction to organic chemistry: organic compounds; structural formulae and conformations; functional groups; Classes of hydrocarbons: alkanes, cycloalkanes: alkanes; alkenes and alkynes; oxidation and reduction; addition reactions; stereo-isomerism. Alcohols, phenols, thiols, ethers: organic compounds of oxygen; common alcohols and phenols. Carboxylic acids and esters, amines and amides: Introduction to carbohydrates, lipids and porphyrins.

SBLG3512: DIVERSITY OF LIFE

Module title: DIVERSITY OF LIFE
Code: SBLG 3512
Course Equivalent: NSSC (/HIGH GRADE) Biology
NQF level: 5
Contact hours: 4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits: 16
Module assessment: Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites: NSCC (Biology C or better)

Module Content:
This module is designed to give students a detailed understanding of the diversity of life. It gives students the broader appreciation of biodiversity in the different ecological habitats. The course shall describe diagnostic characteristics of principle taxonomic categories for each phylum. Coverage of each Phylum shall follow a phylogenetic (evolutionary) approach as well as introduce broad ecological and physiological principles. Various aspects of reproduction and development shall be highlighted. This module prepares students to understand subsequent courses such as Introduction to Ecology and Microbiology, Population Ecology, Comparative physiology, Biogeography, Plant and Animal Form and Function
Topics covered will include viral, bacterial, fungal, algal, animal and plant diversity. It then considers the characteristics and life cycles of the following important algae, animal and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrrophyta, Cryptophyta, Protostomate phyla: Nemertea, Mollusca, Anellida, Arthropoda, Nematoda, Rotifera, Lophophorates, Onychophora. Deuterostomate phyla: Echinodermata, Hemichordata and Chordata (Subphyla: Urochordata, Cephalochordata and Vertebrata: Class Myxiniformes, Petromyzontiformes, Placoderms, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.
Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field.
(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SMAT 3512: PRE-CALCULUS

Module Title: PRE-CALCULUS
Code: SMAT 3512
NQF level: 5
Contact hours: 4 lectures per week for 14 weeks; 2 tutorials per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite: NSSC Mathematics
Module Content:

Functions: one-to-one and onto functions, horizontal line test, composition of functions, inverse of a function. Introduction to exponential and logarithmic functions. Limit of a function: definition, left and right limits, infinite limits, limits at infinity, continuity in terms of limits. Differentiation: rate of change, derivative of a function, rules of differentiation, increasing and decreasing functions and graph sketching. Integration: antiderivatives, the definite integral, area under a graph. Trigonometry: further trigonometric identities, area of a sector and segment of a circle, derivatives and integrals of trigonometric functions.

(Although the above information has been compiled as accurately as possible, the Faculty of Agriculture and Natural Resources cannot be held responsible for any errors and/or omissions which may occur in the above module descriptors of modules offered by other Departments.)

SECOND YEAR MODULES

AAEC 3681: PRINCIPLES OF MICROECONOMICS

Module title:	PRINCIPLES OF MICROECONOMICS
Code:	AAEC 3681
NQF level:	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)
NQF Credits:	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered:	1

Module Content:
The course includes issues such as: introduction to the concept of scarcity, consumer theory, choices under uncertainty, theory of production, cost and output, the theory of the firm under perfect competition, supply and demand analysis, market structures (competitive markets, monopolistic, monopoly and oligopoly), general equilibrium analysis and efficiency, externalities, and public goods.

AAEC 3691: RURAL SOCIOLOGY

Module Title:	RURAL SOCIOLOGY
Code	AAEC 3691
NQF level	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)
NQF Credits	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module investigates the basic sociological concepts and their application to agricultural progress and rural development planning; the significance of rural sociology to agricultural extension and rural development; differences between rural and urban population; culture and culture change, social interaction and social structures; groups and organization, deviance, social class and stratification; Social institutions families; religions; rural/urban migration and environment; social change in global perspective.

AAEC 3682: PRODUCTION ECONOMICS

Module Title:	PRODUCTION ECONOMICS
Code	AAEC 3682
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs)
Assessment Strategies	Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	Co-requisite: AAEC 3681: Principles of Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course includes issues such as: production functions, cost of production, optimum resource allocation, profit maximization, isoquants, product-product relationships, economies of size and scale, technical change, and decision making under risk and uncertainty.

AFST 3681: GENERAL MICROBIOLOGY

Module Title:	GENERAL MICROBIOLOGY
Course Code	AFST 3681
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)

Assessment Strategies	Continuous Assessment 40% (minimum 2 tests, 2 assignments and 4 practicals). Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This course provides a student with a general overview of microbiology including their environment, classifications, their morphology, structures and chemical composition. The biology of bacteria, fungi, algae, protozoa and viruses. Effect of antibiotics on microorganisms, important pathogens of plants and animals. The role of microorganisms in general industries, food industries and in the soils. Concept of microbiology with special reference to microscopy, staining procedure, sterilization, aseptic, pure culture techniques and media preparation.

AASC 3681: GENETICS

Module Title:	GENETICS
Code	AASC 3681
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (2 assignments, 2 tests and at least 5 marked practicals). Examination: 60% (1 x2 hr paper).
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module covers Extension of Mendelian analysis and ratio – incomplete dominance, co-dominance, multiple alleles, gene interactions, pleiotropy, epistasis, lethal genes; Chromosome (Physical structure, Packaging, Karyotype and Variations); The Cell Cycle; Mitosis and its genetic significance; Meiosis and its genetic significance; Sex determination; Sex linkage and general examples of sex-linked inheritance; The molecular structure of DNA – the double helix model; DNA replication in prokaryotes and eukaryotes; Gene expression (Transcription and Translation); Regulation of gene expression – The Lac operon; Mutations (types, causes, detection and significance). The module also introduces students to basic molecular biology concepts. It examines molecular organization of the genomes (prokaryotes and eukaryotes) and molecular structure of genes; it introduces DNA based technology such as Polymerase Chain Reaction (PCR), DNA extraction, electrophoresis, sequencing, genetic engineering and animal cloning.

AASC 3612: BIOCHEMISTRY

Module Title:	BIOCHEMISTRY
Code	AASC 3612
NQF Level	6
Contact hours:	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr/wk for 14 weeks (42hrs
Assessment Strategies	Continuous Assessment: 40% (minimum 2 assignments, 2 tests and at least 5 marked practicals). Examination: 60% (1 x3 hr paper)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Under this course the students will learn about: Physical biochemistry: Acids, bases, buffers, pH, ionic strength, molarity; water (structure and ionization). Structural biochemistry: Structure and function of macromolecules (carbohydrates, proteins and lipids), Vitamins, Coenzymes and Cofactors. Enzymology: Enzymes as organic catalysts; Enzyme nomenclature; Factors affecting activities of enzymes; Enzyme kinetics - The Michaelis-Menten equation; The Lineweaver-Burk plot; Enzyme inhibition; Allosterism. Bioenergetics and thermodynamics: Free Energy, Laws of Energy, Activation Energy, Transition States, Endergonic and exergonic reactions. Metabolism: Catabolism and Anabolism; Carbohydrate catabolism (Glycolysis, Alcohol and lactic acid. Metabolism, Tricarboxylic acid cycle or the TCA cycle; Electron transport chain and oxidative phosphorylation); Regulation of carbohydrate metabolism; Gluconeogenesis; Synthesis of the disaccharides (lactose and sucrose); Synthesis of polysaccharides (starch and glycogen); Lipid metabolism (β-oxidation, malonly CoA); Integration of carbohydrate and fat metabolism; Amino acids and protein metabolism; Urea cycle; The Cori cycle; Pentose phosphate pathway; Glyoxylate cycle in oily seeds. Spectrophotometry: Fundamental laws of spectrophotometry and absorbance.

AFAS 3691: AQUATIC ECOLOGY

Module Title:	AQUATIC ECOLOGY
Code	AFAS 3691
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum 2 assignments, 2 tests and at least 5x marked practicals). Examination: 60% (1 x2 hr paper)
NQF Credits	12
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Abiotic parameters influencing productivity of aquatic systems. Diversity, structure and functioning of the various community structures: phytoplankton, zooplankton and benthos; direct and interact interactions between the biotic and abiotic components of the aquatic systems. Functional webs. Influence of competition. Predation and symbiosis and commensalisms on community structure. Reproduction tactics, growth, survival and fecundity of producers and consumers.

AFAS 3682: INTRODUCTION TO AQUACULTURE

Module Title:	INTRODUCTION TO AQUACULTURE
Code	AFAS 3682
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, 1 marked assignment and 3 practicals); Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module content
History of aquaculture. Types of aquaculture systems and global aquaculture production statistics. Culturable aquaculture species. Site selection for aquaculture practices. Impact of aquaculture systems on the environment and regulations governing aquaculture practices. Environmental factors affecting aquaculture productivity: water quality, soil types, aquatic macrophytes. Pond designs and stocking. Introduction to aquaculture nutrition and feed formulations. Aquaculture diseases and management. Broodstock management and larval rearing. Aquaculture development in Namibia.

AFAS 3601: ICHTHYOLOGY I

Module Title:	ICHTHYOLOGY I
Code	AFAS 3601
NQF Level	6
Contact hours	Lectures: 2 x 1hr/wk for 14 weeks (28hrs); Practical's: 1 x 2hr alternate for 14 weeks (14hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests and 3 marked assignments); Examination: 60% (1 x 2 hr paper)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Introduction to fish biosystematics, phylogeny and classification. Fish evolution; major groups of extinct fish species. External anatomy and variations of fish body forms; morphometric indices, identification and description of major groups of living fish species; agnatha (myxinoidei and petromyzontoidei), chondrichthyes and osteichthyes. Fish skin, colouration and camouflage. Fish scale formation and identification. Use of scale and Otolith in fish aging. Fish migration. Namibia marine and freshwater fish diversity.

AFAS 3692: AQUATIC CHEMISTRY

Module Title:	AQUATIC CHEMISTRY
Course Code	AFAS 3692
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Introduction to water chemical structure. Chemical composition of water bodies. Chemical and physical parameters: pH, salinity, alkalinity and carbon dioxide; total alkalinity and hardness; acidity; dissolved gasses and interaction with atmosphere; decomposition of organic matter; Nutrients and nutrient cycles: phosphorus, nitrogen, sulphur, iron and manganese; silicon and other micro-nutrient constituents. Physical – chemical interactions in oceanic and estuarine environment; Marine system pollution scenario. Irradiance/UVR and heat flux. Instrumentation and methods of measurement of water quality parameters.

ACRSC 3681: BIOSTATISTICS

Module Title:	BIOSTATISTICS
Code	ACRSC 3681
NQF Level	6
Contact hours	3 lecture hours / week for 14 weeks; 3 tutorial / practical hours alternate weeks for 14

Assessment Strategies	Continuous assessment (40%): at least three assessments; Examination (60%): 1 x 2 hr paper
NQF Credits	12
Prerequisite	SMAT 3511 Basic Mathematics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Definition of statistics, descriptive and inferential statistics. Qualitative and quantitative data, primary versus secondary data. Sampling and sample size determinations, and replications. Presentation of data: tables, charts, graphs. Measures of central tendency: mean, mode, median. Measures of dispersion: standard deviation, coefficient of variation, standard error. Probability, Bayes' theorem, combinations and permutations, Binomial, Poisson, and Normal distributions, T-test and F-distribution mean comparisons, Analysis of variance, analysis assumptions. Single and multiple factor experiments, correlation and linear regression, transformations. Research process: research problem formulation, research objectives, hypothesis formulation. Basic experimental designs: completely randomized, randomized complete block, Latin square, Split plot.

AFAN 3682: NATURAL RESOURCE ECONOMICS

Module Title:	NATURAL RESOURCE ECONOMICS
Code	AFAN 3682
NQF Level	6
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests and 3 marked assignments); Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content
Natural resource economics: Renewable and non-renewable resources; natural- and man-made capital: Conservation and development. Sustainability: Resource scarcity and population growth; ecocentric vs. anthropocentric approach; Resource use; the precautionary use of user-pay principle; Economic growth and sustainable development. Brundtland report. Market failures: public goods, externalities. Valuing natural resources: surrogate market techniques, travel time, contingency valuation methods, non-use values; opportunity costs.

THIRD YEAR MODULES

AFAP 3781: PHYSICAL OCEANOGRAPHY

Module Title:	PHYSICAL OCEANOGRAPHY
Code	AFAP 3781
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, 1 assignment and 3 practicals); Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Physical properties of sea water; What drives oceans? Global temperature and salinity distribution. Coastal processes: accumulation, fresh water runoff, sediment transport. Tides and tidal mechanisms. Eddy diffusion and turbulence. Waves and Tsunamis. Coriolis and Ekman transport. Statics (sea at rest) and Dynamics (wind driven and geostrophical currents, vertical water movement, rings and meanders). The Benguela Current system. Environmental conditions and the Fisheries. Physical and oceanographic instrumentation.

AFAS 3781: AQUACULTURE AND FISHERIES PRODUCTS

Module Title:	Aquaculture and Fisheries Products
Code	AFAS 3781
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 practicals); Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	AFAS 3682: Introduction to Aquaculture
Compulsory/Elective	Compulsory
Semester Offered	1

Module content
Aquaculture and Fisheries Products; Fish from farm/sea to the table; storage and slaughter techniques; Harvesting techniques; Processing technologies and preservation methods i.e. smoking, freezing, canning and drying; Transport and logistics;

Packaging ; Nutritional composition; Product Development and value addition; Product Quality and Marketing; Food safety and health ; Quality evaluation; Quality Management Systems.

AFAF 3781:	ICHTHYOLOGY II
Module Title:	ICHTHYOLOGY II
Code	AFAF 3781
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper
NQF Credits	12
Prerequisite	AFAS 3682: Introduction to Aquaculture
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Introduction to fish biology and internal anatomy. Respiration: structure and function of gills, mechanism of gaseous exchange, adaptation for air breathing in lungfishes. Digestive: structure and functions of alimentary canal, food and feeding habits. Excretion: structure and functions of excretory organs, osmoregulation and thermoregulation. Skeleton, muscle and swimming mechanism. Reproduction: structure and functions of gonads, gamete formation and reproductive strategies. Fish endocrinology and hormonal control. Introduction to fish genetics.

ACA 3701:	FIELD ATTACHMENT I
Module Title:	FIELD ATTACHMENT I
Code	ACA 3701
NQF Level	7
Contact hours	Six weeks of Field Attachment
Assessment Strategies	40 % report presentation at a seminar; 60 % Field report. Subject to satisfactory attendance and good conduct during attachment
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
At the end of the Second year, students will be attached to selected institutions for hands-on-experience in selected area of subject specialization. Academic staff will pay field visits to students to discuss with them and their supervising officers on site the knowledge obtained and areas of exposure needing improvement.

AAEC 3781:	FARM PLANNING AND MANAGEMENT
Module Title:	FARM PLANNING AND MANAGEMENT
Code	AAEC 3781
NQF Level	7
NQF Credits	12
Contact Hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)
Prerequisite	AAEC 3682: Production Economics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
The course includes issues such as: management of farm records; machinery; land; labor; and capital, farm business planning, enterprise budgeting, agricultural risk management strategies. Students will be exposed to business planning using spreadsheets.

AFAS 3791:	FISHERIES MANAGEMENT I
Module Title:	FISHERIES MANAGEMENT I
Code	AFAS 3791
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:

Introduction to theories of organization, history of fisheries management, management and decision making, fisheries management authorities (state owned, participatory/community based or co-management); fisheries management plans (design and implementation), fisheries regulations (input, output and technical regulations) enforcement of fisheries legislation (monitoring, control and surveillances; other participatory methods); management costs; characteristics of subsistence artisanal vs. industrial and commercial fisheries; livelihood approaches to fisheries, lesson learned from other countries including (SADC)

AFAS 3792: FISHERIES MANAGEMENT II

Module Title:	FISHERIES MANAGEMENT II
Code	AFAS 3792
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Fisheries development and sustainability, fisheries and Marine Protected Areas (MPA), combating illegal, unreported and unregulated fishing (IUU), sustainable fisheries management approaches: ecosystem approach to fisheries, robust management, adaptive management, precautionary approach to fisheries; fish and seafood marketing and trade; regional fisheries management, law of the sea.

AFAS 3712: INTEGRATED COASTAL ZONE MANAGEMENT

Module Title:	INTEGRATED COASTAL ZONE MANAGEMENT
Code	AFAS 3712
NQF Level	7
Contact hours	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr for 14 weeks (42hrs
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).
NQF Credits	16
Prerequisite	AFAS 3691: Aquatic Ecology
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Potential impacts by climate change and direct human interference on coastal systems. Impact assessment: scooping of habitats, focusing and validation of communities and species, identification and evaluation of impacts. Monitoring. ICZM strategies: coordinated retreat, adaptation (sustainability), protection. Ecological and sociological implications. Internal functioning of companies; company decision making and the influence of externally set conditions with emphasis on Namibian based companies.

AFAS 3782: BASIC AQUACULTURE ENGINEERING

Module Title:	BASIC AQUACULTURE ENGINEERING
Code	AFAS 3782
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).
NQF Credits	12
Prerequisite	AFAS 3682: Introduction to Aquaculture, AFAS 3692: Aquatic Chemistry, AFAS 3691: Aquatic Ecology, AFAS 3602: Ichthyology I
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content
Principles of site selection. Water transport: pipes and pipe parts, types of pumps. Water quality and water treatment. Heating and Cooling. Aeration and oxygenation. Aquaculture recirculating systems. Pond, cage tanks and raceway systems, their construction principles and layout. Fish transportation and size grading systems. Instrumentation and automation in aquaculture.

ACSC 3792: RESEARCH METHODS

Module Title:	RESEARCH METHODS
Code	ACSC 3792
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (1 x 2 hr paper)
NQF Credits	12

Prerequisite	ACSC 3692: Biostatistics
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Students will be exposed to more advanced statistical concepts and research methods above those covered in Biostatistics. Comparison between parametric and non-parametric statistics. Non-parametric statistics: goodness of fit tests; tests of association, Chi Square tests; paired comparisons, Wilcoxon's tests; rank correlation; Multivariate methods: multiple regression, discriminant analysis, canonical analysis, multidimensional scaling, principal component analysis. Review of experimental designs with emphasis to livestock, crop and game animal experimentation. Review of procedures for implementing research projects and presentation of research results with emphasis to practical field situations and case studies. Introduction to Statistical Computer packages

AFAA 3782: AQUACULTURE NUTRITION AND FEED MANUFACTURING

Module Title:	AQUACULTURE NUTRITION AND FEED MANUFACTURING
Code	AFAA 3782:
NQF Level	7
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Assessment Strategies	Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Advantages/disadvantages of natural versus artificial diets; Basic components of artificial diets; Macro- and Micro Nutrients; proteins, carbohydrates, lipid/fats, energy and mineral/vitamins, amino acids, fatty acids, carotenoids; Use of biotechnology in feed enhancement; Nutritional requirements of fish at different life stages and different species. Nutrient digestion and pathways; Sources of feed stuffs/nutrients and binders; Feed formulation models; Least Cost production; Feed manufacturing techniques; Feed stability in water; Assessment of feed performance and fish growth performance.

FOURTH YEAR MODULES

AFAS 3810: RESEARCH PROJECT

Module Title:	RESEARCH PROJECT
Code	AFAS 3810
NQF Level	8
Contact hours	Consultation: 1 x 1hr/wk for 28 weeks (28 hrs)
NQF Credits	32
Prerequisite	ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Content:
Students carry out independent study of a current topic in natural resources and agriculture. The course include participation in meetings organized by the coordinator, work with a faculty advisor to develop a research project, formulate hypotheses, design and carry out preliminary experiments and collect data and test the hypotheses. Students will carry out independent library research, begin experimental work, prepare a written report and make a presentation to other students the proposal and final report. The student will submit a final report written following Guidelines for Scientific Writing.

Assessment Strategies
Continuous assessment (100%) consisting of research proposal write up and presentation of proposal in a seminar, presentation of empirical findings in a second seminar, and grading of the final report.

AACA 3801: FIELD ATTACHMENT II

Module Title:	FIELD ATTACHMENT II
Code	AACA 3801
NQF Level	8
Contact hours	Six weeks of Field Attachment
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
This module is designed to further expose students to the realities of the fishing industry operations in Namibia and beyond. They are expected to observe and participate in different facets of production, processing, marketing, extension and assist with management functions e.g. supervision of general work force and problem solving. Academic staff will pay field visits to students to discuss with them and their supervising officers on site the knowledge obtained and areas of exposure needing improvement.

Assessment Strategies
An attachment report and an oral presentation constitute the total assessment mark: 40% (Field Attachment Seminar Presentations). 60% (Field attachment Reports)

AFAS 3891:	FISHERIES ECONOMICS
Module Title:	FISHERIES ECONOMICS
Code	AFAS 3891
NQF Level	8
Contact hours:	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr/wk alternate for 14 weeks (21hrs)
NQF Credits	12
Prerequisite	AFAN 3682: Natural Resource Economics
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Role of economics in fisheries management. Production technology and efficiency. Catch and cost structure. Producer's surplus and resource rent. Profitability and efficiency parameters. Marketing functions and consumption. Maximum sustainable yield (MSY) versus maximum economic yield (MEY) Welfare economics.

Assessment Strategies
Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).

FAS 3831:	FISH PATHOLOGY
Module Title:	FISH PATHOLOGY
Code	FAS 3831
NQF Level	8
Contact hours	Lectures: 4 x 1hr/wk for 14 weeks (56rs); Practical's: 1 x 3hr/wk for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	SFST 3681: General Microbiology, AFAS 3682: Introduction to Aquaculture
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
General basic pathology and fish immune/defense system. General and basic parasitology, parasite specificity and parasite development cycle. Infectious diseases: viral, bacterial and fungal diseases. Invasive diseases: protozoan infection, mixosporidian infection, crustacean parasites, platyhelminthes infection of fish. Non- infectious diseases. Diseases of unknown etiology. Basic histopathology. Fish disease diagnosis, treatment and prophylaxis.. Biosecurity and animal welfare.

Assessment Strategies
Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 10 marked practicals); Examination: 60% (1 x 3 hr paper).

AENE 3882:	ENVIRONMENTAL IMPACT ASSESSMENT
Module Title:	ENVIRONMENTAL IMPACT ASSESSMENT
Code	AENE 3882
NQF Level	8
Contact hours:	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
NQF Credits	12
Prerequisite	AFAS 3712: Integrated Coastal Zone Management
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Definitions: impact assessment, Environmental studies, Environmental Impacts of Human Activities on Natural Resources; impact on atmosphere, impact on water bodies, impact on wildlife, impact on forests; Environmental considerations in Physical planning. Impact identification, monitoring and mitigation; methods of identifying impacts, methods of monitoring environmental impacts, types of mitigation actions. Formal Environmental Impact Assessment: Origins and significance of formalized approach; historical context and rationale; major issues in formal EIA process; procedure of formal EIA process, common methodologies and examples o their application, Choosing an appropriate methodology. Policy and Framework in Namibia: monitoring and quality control, role of Departmental Affairs; EIA in Namibia.

Assessment strategies
Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).

FAS 3811:	BIOLOGICAL OCEANOGRAPHY
Module Title:	**BIOLOGICAL OCEANOGRAPHY**
Code	FAS 3811
NQF Level	8
Contact hours:	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr/wk for 14 weeks (42hrs)

NQF Credits	16
Prerequisite	AFAP 3781: Physical Oceanography, AFAS 3692: Aquatic Chemistry
Compulsory/Elective	Compulsory
Semester Offered	1

Module Content:
Abiotic factors: Properties of sea water and sediment – sea water reactions. Dissolved nutrients, nutrient cycling and chemical – biological interactions. Biotic factors: Inhabitants of the pelagic biota (bacteria, algae, zooplankton, fish). Primary production, -regulation and regional aspects. Energy transfer and food chain processes. Pelagic – benthic interactions. Microbiology of oceans. Types of biotopes: polar, temperate and tropical systems. Marine system carrying capacity. Sampling gear and methods of species biomass assessment. Marine remote sensing. Oceanographic instrumentation and methods of measurement.

Assessment Strategies
Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 10 marked practicals); Examination: 60% (1 x 3 hr paper).

AFAS 3812: FISH POPULATION DYNAMICS

Module Title:	FISH POPULATION DYNAMICS
Code	AFAS 3812
NQF Level	8
Contact hours:	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr/wk for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	ACSC 3692: Biostatistics, ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
An overview of fishing technology, design and choice of vessel and gear technology, fish aggregating- and selective devices, Impact of fishing gear on environment. Concepts in Fisheries science, estimation of age and growth parameters, estimation of mortality, gear selectivity, sampling, exponential decay model, stock recruitment relationship, non-age and age structured models, reference points, and projection model.

Assessment Strategies
Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 10 marked practicals); Examination: 60% (1 x 3 hr paper).

AFAS 3832: AQUACULTURE MANAGEMENT

Module Title:	AQUACULTURE MANAGEMENT
Code	AFAS 3832
NQF Level	8
Contact hours:	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr/wk for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	AFAS 3682: Introduction to Aquaculture, AFAS 3792: Basic Aquaculture Engineering, AFAS 3781: Aquaculture Nutrition and Feed Manufacturing
Compulsory/Elective	Compulsory
Semester Offered	2

Module Content:
Broodstock, hatchery, water quality management. Live feed production. Selection breeding. Broodstock conditioning. Hygiene requirements on the farm. Bio-security. General Human Resources. Financial projections of aquaculture enterprises.

Assessment Strategies
Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 10 marked practicals); Examination: 60% (1 x 3 hr paper).

POSTGRADUATE TRAINING PROGRAMMES AT UNAM

Students who are on full time employment should take studies on a part time basis.

Postgraduate Diploma Programmes

1. UNAM makes provision for Postgraduate Diploma programmes in selected fields as approved by Senate.

2. Postgraduate Diploma programmes offer specialised training, which is career-oriented.

3. Postgraduate Diploma programmes have a minimum of one year duration for full-time students, and two years for part-time students; are taught programmes (i.e. involve lectures, seminars, practicals, written tests and examinations, etc); and also include a small independent research component.

Q.1.2. Master's Degree Programmes

1. Postgraduate training programmes at Master's degree level are of two types:
Master's degree by research culminating in a thesis.
Taught Master's degree involving at least one academic year of coursework followed by a mini thesis.

Students admitted to Master's degree programmes enrol on either a full time or part time basis. Master's degree programmes have minimum of two years duration for full-time students and three years for part-time students; and a maximum of three years for full time students and maximum of five years for part-time students, unless otherwise stipulated by programme specific regulations.

Q.1.3. Doctoral Programmes

1. Doctoral programmes at UNAM are normally undertaken by research and the writing of a dissertation unless otherwise approved by Senate. The duration of a doctoral programme is a minimum of three for full-time studies and four years for part-time students; and a maximum of four years for full time students and maximum of six years for part-time students.

2. Doctoral study opportunities at UNAM are offered where the departments have the necessary qualifications for admission, where the relevant Department has the necessary research facilities and infrastructure, and where sufficiently qualified and experienced academics are available and ready to provide effective supervision.

Q.1.4. Approval of Postgraduate Programmes

All programmes should be considered by the UNAM Postgraduate Studies Committee to ensure that they adhere to the UNAM Postgraduate regulations and standards of quality, before these programmes are recommended by the Academic Planning Committee (APC) to Senate for approval.

Q.2. REGULATIONS AND GUIDELINES GOVERNING POSTGRADUATE APPLICATIONS

Q.2.1 Eligibility for Admission/ Procedures to Apply for Postgraduate Studies

UNAM welcomes students with a range of qualifications from all over the world. Applicants must fulfil the minimum admission requirements for entry as well as English Language requirement (if relevant) as indicated. Competition for places in some programmes is extremely high, and the minimum requirement given may not be sufficient to be admitted. Due to this, applicants may be requested to undergo further screening processes.

Q.2.2 Postgraduate Diploma

1. Prospective students must be in possession of a relevant Bachelor's degree from UNAM or any other recognised institution.

2. Students who do not comply with (1) above may also be considered according to the University approved Recognition of Prior Learning (RPL) Policy.

Q.2.3 Master's Degree

1. Prospective students must be in possession of a NQF (Namibian National Qualifications Framework) Level 8 Bachelor (honours) degree qualification or equivalent, with an overall grade average of 60% (and above) from UNAM or any other recognised institution, in the chosen field of study.

2. In addition, prospective students must satisfy Faculty specific requirements as indicated in the admission requirements of the relevant programme (e.g. minimum two years teaching experience and a screening test for M.Ed. admission).

Q.2.4 Doctor of Philosophy Degree and other Doctoral Programmes

1. Prospective candidates must be in possession of a NQF level 9 Master's degree or equivalent from UNAM or any other recognised institution, in the chosen field of study.

2. Students who enrolled for a Master's degree by thesis only may be considered for upgrading into the Doctoral Programme if, during the second year of registration they demonstrate sufficient original contribution(s) to knowledge as motivated by the supervisors through the Faculty Postgraduate Studies Committee and approved by the UNAM PGSC.