

FACULTY PROSPECTUS 2016

**FACULTY OF AGRICULTURE
AND
NATURAL RESOURCES**

NOTE

This Faculty Prospectus is valid for 2016 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 Faculty 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 2016.

The fact that particulars of a specific programme, subject or module have been included in this Faculty Prospectus does not necessarily mean that such a programme, subject or module will be offered in 2016 or any subsequent year.

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

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FACULTY PREAMBLE

MISSION

The Mission of the Faculty of Agriculture and Natural Resources 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 Faculty 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”

2016 ACADEMIC CALENDAR

SEMESTER 1

11 January	University opens
18 January - 03 February	Annual Registration
21 January	Academic staff resumes office duties
01 February	Lectures commence for FIRST SEMESTER
22 March	1 st Semester break starts
29 March	Lectures resume after 1 st Semester break
06 May	Lectures end for FIRST SEMESTER
10 May	Regular Examinations commence (Semester I modules)
01 June	Regular Examinations end
13 June - 17 June	Supplementary/Special Examinations
17 June	End of 1st Semester
27 June - 01 July	Mid-year recess

SEMESTER 2

11 July	Lectures commence for SECOND SEMESTER
22 August	2 nd Semester break starts
29 August	Lectures resume after 2 nd Semester break
14 October	Lectures end for SECOND SEMESTER
18 October	Regular Examinations commence (Semester 2 & Double modules)
11 November	Regular Examinations end
21 November - 25 November	Supplementary/Special Examinations
25 November	End of 2nd Semester
16 December	Academic Year ends & University closes (until 11 January 2017)

11 January 2017	University opens (2017 academic year)
24 January 2017	Academic staff resumes office duties

DUE DATES FOR THE 2016 ACADEMIC YEAR

(i) GENERAL

Last day for appeals (Sem 2 & Double modules – Reg & Supp/Spec exams of Nov 2015)	22 Jan
Last day for application of retention of continuous assessment (CA) mark & Promotion Exam	29 Jan
Last day for application for exemption(s)	29 Jan
Last day for Late Registration (<i>Late fee payable</i>)	05 Feb
Last day for approval of exemption(s)	05 Feb
Last day for approval of retention of continuous assessment mark and Promotion Exam	05 Feb
Last day for approval of module(s) & qualification changes	05 Feb
Last day for change of offering types at Regional Centres (Semester 1 modules)	29 Apr
Last day for Appeals (Semester 1 modules (Reg & Supp/ Spec Exams of June 2016))	22 Jul
Last day to submit outstanding documentation	19 Aug
Last day to change offering types at Regional Centres (Semester 2 modules)	16 Sep
Last day to cancel enrolment	23 Sept
Last day to submit Theses and Dissertations for examinations	30 Oct

(ii) CANCELLATIONS

Semester 1 modules

Last day to cancel Semester 1 modules.....06 May

Semester 2 modules

Last day to cancel Semester 2 modules.....23 Sept

Double modules (A double module normally extends over one academic year)

Last day to cancel Double modules..... 23 Sept

(iii) FINANCE

Semester 1 modules

Last day to cancel with 100 % credit.....04 March

Last day to cancel with 50 % credit.....15 April

Semester 2 modules

Last day to cancel with 100 % credit..... 05 August

Last day to cancel with 50 % credit.....24 August

Double modules (a double module normally extends over one academic year)

Last day to cancel with 100 % credit.....04 March

Last day to cancel with 50 % credit.....03 June

STRUCTURE AND PERSONNEL OF THE FACULTY

OFFICE OF THE DEAN

☎ (+264 61) 206 3890 ☎ (+264 61) 206 3013 ✉ ehijarunguru@unam.na ✉ Private Bag 13301, Windhoek, Namibia

Dean:

Deputy Dean (Neudamm

Campus):

Deputy Dean (Ogongo

Campus):

Faculty Officer:

Mr E Nowaseb: B.A. (Augustana College, Rock Island, Illinois, USA)

Examinations Officer:

Mr J Tischer: Dipl in Education (MASTEP); B Ed (Hons) Leadership & Change Management (IUM-NAMIBIA)

Secretary:

Ms E K Hijarunguru: National Diploma Information Administration (Polytechnic of Namibia); B-Tech Transport Management (Polytechnic of Namibia)

Senior Researcher and

Projects Coordinator:

vacant

Faculty Librarian:

Ms M T TJITUKA: B.A. (Hons) Public Admin (Polytechnic of Wales); Postgraduate Dipl in Library & Info Studies (University College London); M .A. Library & Info Studies (University of London); Cert. Advanced Studies in Library & Info. Sci (Long Island Univ, New York)

**Subject Librarian / Staff
Dev Fellow**

Ms N S T Uugwanga: Diploma Information Studies (UNAM); B A Library Science & Records Management & History (UNAM); Postgraduate Diploma in Library & Information Studies (UCT) Study leave (MLIS UCT)

Senior Library Assistant:

Mr T Ntesa: Dipl Information Studies (UNAM)

Library Assistant:

Ms E Nguvauva: Dipl Records Management (Southern Business School)

Library Assistant:

Mrs M Kaahangoro: Dipl Records Management (Southern Business School)

Student Support Officer:

Mr K Katire {{Office of the Dean of Students}}

NEUDAMM CAMPUS

☎ (+264 61) 206 4111 ☎ (+264 61) 206 4027 ✉ alubbe@unam.na ✉ Private Bag 13188, Windhoek, Namibia

Deputy Dean:

Farm & Campus Manager

vacant

Campus Administrator:

Mrs A Lubbe: B.A., HED (University of Free State, Bloemfontein)

Farm Administrator:

Mr E Beukes: National Dipl. Agric (Tsumis)

Administrative Assistant:

Ms A R Beukes

Cashier:

Ms I W Mouton

Estates Officer:

Mr S Isaacs: Dipl. Urban Housing (IHS)

Supervisor:

Mr G V Kandjii: National Dip. Agric (Tsumis)

Supervisor:

Mr P Beukes: National Dip. Agric (Tsumis)

Supervisor:

Mr B M Matomola: National Dip. Agric (Neudamm)

Supervisor:

Mr J Ngavetene: National Dip. Agric (Neudamm)

Supervisor:

Mr W Goussard: Trade Dip. Motor Mechanic

Assistant Supervisor:

Mr G /Gomxob: Trade Dip. Diesel Mechanic

Assistant Supervisor:

Mr F Dikoro

Assistant Supervisor:

Mr R Fredericks

Assistant Supervisor:

Mr R Kandjou

Assistant Supervisor:

Mr I Lisias

OGONGO CAMPUS

☎ (+264 65) 223 5000 ☎ (+264 65) 223 5265 ✉ ikalimba@unam.na ✉ Private Bag 5520 Oshakati, Namibia

Deputy Dean:

Campus Manager: Mr M Nghihangwa: Dipl. pA (Polytechnic of Namibia); B-Tech (Unisa); Cert Ad Ed (Unisa); MpA (UWC)

Farm Manager: Mr M Samuel: National Dipl Agric (Neudamm); B Sc Agric (Univ Free State, Bloemfontein)

Assistant Faculty Officer: Mr M Simasiku: B A Library Science & Records Mgt (UNAM)

Student Support Officer: Mr I Kalimba: (A+ Cert (UNAM), Cert Client Server Tech (India), Dipl Info Tech (N.C.I) Nam, Dipl IBM. (BMT College, SA)

Examinations Officer: Ms J Amupolo: B. Econ (Unam); B.Econ (Hons) Univ Western Cape

Farm Administrator: Mr V Namwoonde: Dipl Agric (Ogongo College)

Subject Librarian: Ms C N Nakanduungile: Dip Information Studies (UNAM); B A Library Science & Records Management, Psychology (UNAM)

Senior Library Assistant: Mr J Kambuta

Library Assistant: Ms T N Andowa

Library Assistant: Ms S Shiimbi: Dipl Information Studies

Library Assistant: Ms S Kayofa: Diploma Information Studies (UNAM); Diploma HIV / AIDS Management & Counselling (UNAM)

Administrative Assistant: Ms M A N Mandumbwa-Kambatuku: Dipl Business Admin (DAPP); Dipl Public Relations (Unam)

Administrative Assistant: Ms T Abed

Assistant Stores Controller: Ms A Negwila

Finance and Procurement Officer: Mr H Uupindi

Supervisor: Mr T Lwiinga

Supervisor: Mr F Ekondo

Supervisor: Mr M Shishwandu

Manager: A Malyenge

Assistant Supervisor: Ms T Muhama

Assistant Supervisor: Mr D Shikola

General enquiries regarding the programmes offered by the Faculty of Agriculture and Natural Resources should be directed to:

The Faculty Officer

Faculty of Agriculture and Natural Resources

University of Namibia

Private Bag 13301

WINDHOEK

Namibia

Tel: (061) 206 3363 / 3890

Fax: (061) 206 3013 / 206 4027

E-mail: enowaseb@unam.na

Website: www.unam.na → FANR (Faculty of Agriculture & Natural Resources)

OR

The Assistant Faculty Officer

Faculty of Agriculture and Natural Resources

University of Namibia

Private Bag 5520

OSHAKATI

Namibia

Tel: (065) 223 5000

Fax: (061) 223 5294

E-mail: msimasiku@unam.na

Website: www.unam.na → FANR (Faculty of Agriculture & Natural Resources)

Enquiries regarding specific subjects and departments must be addressed to the relevant Head of Department.

ACADEMIC DEPARTMENTS

DEPARTMENT OF AGRICULTURAL ECONOMICS (Neudamm Campus)

☎ (+264 65) 223 5402 ☎ (+264 65) 223 5294 ✉ mhangula@unam.na ✉ Private Bag 5520, Oshakati, Namibia

Head of Department:	Ms M M Hangula
Associate Professor:	H. M Bello: B Sc (Hons) Agriculture (Ahmadu Bello University- Nigeria); M Sc Agric Economics (Texas A & M University, USA); Ph.D. Agric Economics (Usmanu Danfodiyo University, Nigeria)
Senior Lecturer	Mr B Thomas: B Sc Agric (UNAM); M Sc Agric Econ (Stellenbosch)
Lecturer:	Mr S K Kalundu: NatDip Agric (Neudamm); B.Sc. Agric (UNAM); M.Sc. Agric Econ (Arkansas, USA) (Study Leave, PhD Univ Pretoria)
Lecturer:	Ms M Nandi: Dip Agric (Polytechnic); B.Agric Mgt (Natal); M.Sc.Dev Econ (Norway)
Lecturer:	Ms M M Hangula: NatDip Agric (Ogongo); B.Sc. Agric (UNAM); M. Sc. Agric & Resource Econ (Alberta, Canada)
Lecturer:	Mr M N Angula: NatDip Agric (Ogongo); B.Sc. Agric (UNAM); M.Sc. (Michigan,USA)
Lecturer:	Mr M M Eiseb: Dip Agric (Polytechnic); B.Sc, M.Sc. Agric Econ (Fort Hare)
Lecturer:	Mr C Togarepi: Bsc Agric (UNAM); PGDE (UNAM), M.Sc Agric Econ (UNAM)
Lecturer:	Ms C N Jona: B.Sc. Agric (UNAM); B.Sc. (Hons) Pretoria, M.Sc. Agric Extension (Pretoria) study leave (PhD Agric Extension, Pretoria)
Lecturer:	Mr J N Muzanima: B Sc Agric Economics (UNAM); M Sc Agric Economics (IARI, India)
Assistant Lecturer:	Ms E R Sheehama: B.Sc. Agric (UNAM); B.Sc. (Hons) Free State Univ.
Assistant Lecturer:	Mr T Maharero: B.Sc. Agric (Natal)

DEPARTMENT OF ANIMAL SCIENCE (Neudamm Campus)

☎ (+264 61) 206 3930 ☎ (+264 61) 206 3013 ✉ spmuteka@unam.na ✉ Private Bag 13301, Windhoek, Namibia

Head of Department:	Mr S P Muteka
Professor:	Vacant
Associate Professor:	Prof Irvin D.T. Mpofu: B.Sc. Animal Sci Hons (Zim), M.Sc. (Zim), PhD (Pretoria), MBA (Zim).
Senior Lecturer:	Dr E. Lutaaya: B.Sc. Agric. (Makerere); M.Sc. (Texas A & M); PhD (Georgia).
Senior Lecturer:	Dr T.O. Itenge: B.Sc. (Hons), Biomedical Sciences (Murdoch University, Western Australia); PhD, Molecular Genetics and Wool Science (Lincoln University, New Zealand).
Senior Lecturer:	Vacant
Lecturer:	Dr N.P. Petrus: B.Agric Animal Science Hons, University of Nigeria Nsukka (Nigeria); M.Sc. (CIRAD- Montpellier (France).
Lecturer:	Dr C. Mberema: B.Sc. Agric (UNAM); M.Sc. Animal Science, (University of Arizona USA); PhD, Molecular Genetics and Meat science (Newcastle University, UK)
Lecturer:	Mr S.P. Muteka: B.Sc. (Concordia), M.Sc. (Pretoria)
Lecturer:	Ms M. Shipandeni: National Dip Agric (Ogongo), B.Sc. Agric (UNAM); M Sc Animal Science/Animal Nutrition (Wageningen University, The Netherlands)
Lecturer:	Mr A. Kahumba: Diploma Agric, BSc Education Science (UNAM), MSc RR&M (UNAM)
Lecturer:	Mr O. K Mbango. BSc Agric, Animal science (UNAM); MSc RR&M (UNAM)
Lecturer:	Ms T Uushona: B Sc Agric, Animal Science (UNAM); M Sc Agric (cum laude) Stellenbosch
Lecturer:	Ms M. Nepembe: M.Sc. Agric (Patrice Lumumba P F Univ).
Tutor:	Vacant

Technologist: Mr L.S. Samunzala: National Dip. Agric., Neudamm, BBA (UNAM)
Technologist: Ms. S. Hafeni: B.Sc. Agric (UNAM); M.Sc. Agric. (UNAM)
Technologist: Vacant

DEPARTMENT OF CROP SCIENCE (Ogongo Campus)

☎ (+264 65) 223 5204 ☎ (+264 65) 223 5294 ✉ fitana@unam.na ✉ Private Bag 5520 Oshakati, Namibia

Head of Department: Prof FD Itanna

Professor: Prof O D Mwandemele: B.Sc. Hons; M.Sc. (Dar-es-Salaam); PhD (Sydney); Elected Fellow (ISGPB), Member UNU/INRA College of Res. Associates

Professor: Prof FD Itanna: BSc (Alemaya), MSc (Alemaya), PhD (Hohonheim)

Professor: Prof L S M Akundabweni: BSc, (Minnesota), MSc, PhD (South Dakota)

Lecturer: Ms S Niitembu: MSc.(Patrice Lumumba); Diploma Animal Health, (Torgau,Leipzig)

Lecturer: Ms O T Shivolo: Nat'l Dip Agric (Ogongo); B.Sc. Agric (UNAM), M.Sc. Crop Protection (University of Nairobi, Kenya)

Lecturer: Mr P A Ausiku: National Dip Agric (Ogongo); B.Sc. Agric (UNAM); M Sc Agric (Kinki Univ., Japan)

Lecturer: Ms N Nghishitivali: M.Sc. Agric (Cuba)

Lecturer: Mr F Shinombedi: M.Sc. Agric Eng (Czechelsovakia)

Lecturer: Mr G Hatutale: B.Sc. Agric (UNAM), M.Sc. Horticulture (Free-Sate Univ)

Lecturer: Mr K Hove: B Sc Mathematics (Hons) (MSU); M Sc Operations Research (NUST); PGDE (NUST)

Lecturer: Mr J Chigariro: Dipl Agric (Gwebi, Zim); PGDipl Grain Storage Management (UK); M Sc Grain Storage Management (Greenwich University, UK)

Assistant Lecturer: Ms H Kandongo: B.Sc. Agric Mechanisation (Karl Marx University)

Staff Dev Fellow: Ms C. K. Kamburona-Ngavtene: B.Sc. Agric (UNAM); MSc. Genetics (Pretoria). Study Leave (Germany)
 Mr S K Awala: National Dip Agric (Neudamm); B.Sc. Agric (UNAM), M. Agric. Sc. (Nagoya Univ., Japan). Study Leave (Kinki, Japan)
 Mr P I Nanhapo: B.Sc. Agric (UNAM) M. Agric. Sc. (Nagoya Univ., Japan). Study Leave (Kinki, Japan)

Technologist: Ms A N Aluvilu: National Dip. Agric (Polytechnic of Namibia); B.Tech Agric (Cape Technikon), M. Agric (University of Limpopo)

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY (Neudamm Campus)

☎ (+264 61) 206 4003 ☎ (+264 61) 206 3013 ✉ mnambabi@unam.na ✉ Private Bag 13301, Windhoek, Namibia

Head of Department: Dr M NNN Shikongo-Nambabi

Senior Lecturer: Dr M NNN Shikongo-Nambabi: B.Sc. Hons Biochemistry (Kent Univ); M.Sc. Applied Immunology (Brunel Univ.); Ph. D Microbiology (Univ. Pretoria)

Senior Lecturer: Dr K K M Nantanga: B Sc (UNAM); B Sc Hons (Rhodes University, SA); M Sc (Univ Pretoria, SA); PhD (Univ Guelph, Canada)

Lecturer: Dr P Hiwilepo-Van Hal: B. Sc. Agric (UNAM); M. Sc; Ph D Food Science (Wageningen)

Lecturer: Mr C Samundengu: B. Eng. (UNSA); B. Eng. Hons; M. Eng. (Univ. Pretoria); Post Grad. Dip. Bus. Admin. (UNAM)

Lecturer/Staff Dev Fellow: Mr S C Barrion: B. Sc. Agric (UNAM); B. Sc. Hons Food Science (Univ. Pretoria), M. Sc. (Distinction) Food Science & Technology (Univ. Pretoria) (Study Leave, PhD University of Surrey)

Lecturer: Ms M Kandjou-Hambeka: B Sc. Agric Food Science & Technology (UNAM); M Sc Dairy Science & Technology (Univ Zimbabwe)

Technologist: Mr S Emvula: B Sc Agric (Unam); M Sc (Stellenbosch)

Technologist: Ms W V Aindongo: National Dipl Agric (Ogongo); B Sc Agric, Food Science & Technology (UNAM); M Sc Food Science (Stellenbosch)
Technologist: Ms M H Hamunyela: B Sc Microbiology & Biochemistry (Unam)

DEPARTMENT OF FISHERIES & AQUATIC SCIENCES (Sam Nujoma Campus)

☎ (+264 64) 502 464 ✉ lkandjengo@unam.na ✉ P.O. Box 462, Henties Bay, Namibia

Head of Department: Mr L Kandjengo

Professor: Prof E Omoregie: B Sc (Univ of Jos, Nigeria); M Sc (Univ of Jos, Nigeria); M Sc (Portsmouth, UK); PhD (Univ of Jos, Nigeria)
 Mr F P Nashima: B.Sc. (UNAM); M.Sc. (UNAM)

Senior Lecturer: Vacant

Senior Lecturer: Dr S K Mafwila: B.Sc. (UNAM); PGDE (UNAM); B.Sc.Hons (Rhodes); M.Sc. (UCT)
 PhD (UCT)

Lecturer: Dr. JA Iitembu: B.Sc. (UNAM), M.Sc. (Univ. of Tromso), Ph.D. (Rhodes)

Lecturer: Mr L Kandjengo: B.Sc. (UNAM); B.Sc. Hons (UCT), M.Sc. (UCT)

Lecturer: Mr JA Esterhuizen: B.Sc. (UNAM); B.Sc. Hons, M.Sc. (Rhodes)

Lecturer: Mr M Tjipute: B.Sc. Astrakhan State Technical Univ, Russian Federation); M.Sc. (Russia); Postgraduate Certificate in Sustainable Aquaculture (United Nations Univ)

Lecturer: Mrs D N Nakwaya-Jacobus: B.Sc. (UNAM); M.Sc. (UNAM)

Lecturer: Vacant

Staff Development Fellow: Ms SM Isala: B.Sc. (UNAM) (*Study leave, MSc Jomo Kenyatta University, Kenya*)

Technologist: Mr T Akawa: B.Sc. (UNAM), M Phil (Univ. of Stellenbosch)

Technologist: Mr M Hanghome: ND Natural Resources Management (PoN), Bachelors Cert. Env Engineering (CPUT), M.Sc. (UFS)

SAM NUJOMA CAMPUS

☎ (+264 64) 502 600 ✉ euahindua@unam.na ✉ P.O. Box 462, Henties Bay, Namibia

Campus Director: Prof E Omoregie: B Sc (Univ of Jos, Nigeria); M Sc (Univ of Jos, Nigeria); M Sc (Portsmouth, UK); PhD (Univ of Jos, Nigeria)

Head of Department: Mr L Kandjengo: B.Sc. (UNAM); B.Sc. Hons (UCT), M.Sc. (UCT)

Office Administrator: Ms E Uahindua: Secretarial Certificate (CCOSA - Zimbabwe)

Assistant Librarian: Ms L lipinge: B.A. Library Science and Resource Management (UNAM)

Library Assistant: Mr E Thaniseb: Dipl Library and Information Studies (Univ of Botswana)

Estates Officer: Mr M Dominicus: Dipl (WVTC)

Security Officer Mr TS Shaanika

Students Support Officer: Ms E Simon (Office of the Dean of Students)

Student Records Officer and Examination Officer: Mr M Kangootui: Adult Basic Education & Training Certificate (ABET), UNISA; Dipl Public Management (Polytechnic of Namibia)

IT Officer Mr T Nampala

DEPARTMENT OF INTEGRATED ENVIRONMENTAL SCIENCE (Ogongo Campus)

☎ (+264 65) 223 5000 ☎ (+264 65) 223 5205 ✉ endeunyema@unam.na ✉ Private Bag 5520 Oshakati, Namibia

Head of Department: Dr E Ndeunyema

Associate Professor: vacant

Senior Lecturer: Dr J Njunge: B.Sc. Forestry (Moi University); M.Sc. Plant and Fungal Taxonomy (Reading Univ); PhD Forest Ecology (University of Wales)

Lecturer:	Dr E Ndeunyema: National Dip Agric (OAC); B.Sc. Forestry (Wales Univ, Bangor); M.Sc. Agroforestry (Wales Univ, Bangor), PhD Forestry (ethnobotany) (Wales Univ, Bangor)
Lecturer:	Dr J R Kambatuku: B Sc Zoology & Botany (Unam); M Sc Water Resources (Univ Wales); PhD Ecology (Univ Kwazulu-Natal)
Lecturer:	Ms A Ndeinoma: National Dipl Agric (OAC); B.Sc. Forestry, M.Sc. Environmental Impact Assessment (Stellenbosch); Postgraduate Diploma in Education (UNAM) study leave (Wageningen)
Lecturer:	Mr F. Nambuli: National Diploma in Forestry (Ogongo UNAM Campus), BSc in Nature conservation (Nelson Mandela Metropolitan University), MSc in Environmental and Resource Management (Brandenburgische Technische Univesat Cottbus).
Lecturer:	Ms L Halueendo: B.Sc. Zoology, Botany & Psychology (UNAM); B.Sc Hons Crop Protection (Pretoria); M.Sc. Crop Protection (Pretoria)
Lecturer:	Mr I Kaholongo: Cert Forestry (OAC); B.Sc. Forestry (Stellenbosch); M.Sc. Biodiversity Management and Research (UNAM)
Lecturer:	Ms J Niipele: B.A. Tourism (UNAM); M. Sc. Geo-Information Science & Earth Observation Nat Res Mgt (Univ. Twente, The Netherlands) on study leave
Lecturer:	Mr E. Kasiringua: M.Sc. Applied Ecology (Hedmark University College) on study leave
Technologist:	Mr J Hambia: B.Sc. Natural Resources (UNAM); B Sc (Hons) in Applied Science: Environmental Technology (Univ Pretoria)
Technologist:	Ms A I Shipanga: B.Sc. Environmental & Physiological and Molecular Biology (UNAM)
Field Supervisor:	Mr F Ekondo: National Dip Natural Resource Management (Polytechnic of Namibia); B Tech Agric Management (Polytechnic of Namibia); B. Hons Agric Management (Free State Univ)

DEPARTMENT OF WILDLIFE MANAGEMENT (Katima Mulilo Campus)

☎ (+264 66) 262 6000 📠 (+264 66) 253 964 ✉ eklingelhoefter@unam.na Private Bag 1096, Venela Road, Katima Mulilo, Namibia

Head of Department:	Dr E Klingelhoefter
Associate Professor:	Prof G Kopij PhD – Ornithology (University of Orange Free State); MSc – Animal Ecology (Wroclaw University)
Senior Lecturer:	Dr E Klingelhoefter PhD – Oceanography/Fish Stock Assessment: University of Port Elizabeth (UPE) - Nelson Mandela Metropolitan University, South Africa; Master of Science (MSc) – Terrestrial Ecology/Wildlife Management (University of Pretoria), South Africa; Bachelor of Science Honours (BSc Hon) in Wildlife Management (University of Pretoria, South Africa); Bachelor of Science (BSc) with major in Zoology and Botany: University of Port Elizabeth (UPE) – South Africa; Tertiary Education Diploma (major in Androgocis and Gerongocis) – University of South Africa (UNISA), South Africa.
Lecturer:	Mr J Kairu MSc Natural Resource Management (1991)- Agricultural University of Norway (AUN); PGD (1990) Management of Natural Resources and sustainable agriculture (AUN); BSc (Wildlife Management) (1988) Moi University; Diploma (Wildlife Management) (1977) -CAWM
Lecturer:	Mr J Nakanyala MA (Geography and Environmental Studies (UNAM); BA (Geography and Environmental Studies) (UNAM)
Lecturer:	Mr E Simasiku MSc Fisheries Ichthyology (Rhodes University) BSc Hon. Zoology (UCT); B.Sc. Fisheries and Aquatic Science (UNAM
Lecturer:	Mr M S Lukubwe MSc (2014)- Geographical Information Science and Systems, University of Salzburg, Austria B.A (2007) - Tourism, University of Namibia, Namibia;
Lecturer:	Ms S N Kosmas MSc (2013) Environmental and Resource Management, Brandenburg University of Technology, Cottbus, Germany,

Lab Technologist: J Amutenya

BSc. (2011) Fisheries and Aquatic Sciences, University of Namibia
BSc (Hons) Integrated Environmental Science, UNAM
Diploma in Agriculture, Ogongo College

SCHOOL OF VETERINARY MEDICINE (Neudamm Campus)

☎ (+264 61) 206 4183 ☎ (+264 61) 206 4183 ✉ amarais@unam.na ✉ Private Bag 13301 Windhoek, Namibia

Associate Dean: Dr A. Marais: BVSc (University of Pretoria); MSc (Stellenbosch University); PhD (University of Pretoria)

Deputy Associate Dean: Vacant

DEPARTMENT OF VETERINARY MEDICINE (Neudamm Campus)

☎ (+264 61) 206 4183 ☎ (+264 61) 206 4050 ✉ bmushonga@unam.na ✉ Private Bag 13301 Windhoek, Namibia

Head of Department: Dr B Mushonga: BSc (Hons) Veterinary Anatomy; BVSc (University of Zimbabwe); MVSc Veterinary Anatomy and Pathology (University of Utrecht)

Associate Professor: Prof. J. R. Lyaku: BVSc (Sokoine University of Agriculture, Tanzania); MVSc in Virology-Immunology (Univ of Edinburgh, Scotland); PhD in Virology-Immunology (Univ of Glasgow, Scotland)

Associate Professor: Prof. F. Mause: BSc(Kharkov Zoo-Veterinary Institute Ukraine), MSc(Zoo-Veterinary Institute, Ukraine), PhD (Kharkov Livestock Research Institute, Ukrainian Academy of Agrarian Sciences, Ukraine)

Senior Lecturer: Dr. C. Ntahonshikira: B Sc, MSc in Veterinary Medicine (Kiev, Ukraine); PhD in Veterinary Microbiology & Virology (Kiev Veterinary Research Institute (Ukraine)

Senior Lecturer Dr B. Mushonga: BSc (Hons) (Veterinary Anatomy); BVSc (University of Zimbabwe); MVSc Veterinary Anatomy and Pathology (University of Utrecht

Lecturer: Dr B. Kaurivi: BSc (Biology) University of Namibia); BVSc (University of Zimbabwe); MVSc (University of Sidney)

Lecturer: Vacant

Assistant Lecturer: Dr B. Chiwome: BVSc (University of Zimbabwe)

Staff Dev Fellow: Ms. Magrencia Hausiku: BSc. Agriculture (Animal Science), University of Namibia

Technologist Ms K. Nghole: BSc Agric (Hons) Food Science and Tech (University of Namibia)

Technologist Ms M. Amukwaya: BSc Hons Microbiology and Chemistry (University of Namibia)

Technologist Ms Iyamboh: BSc Hons Microbiology and Chemistry (University of Namibia)

DEPARTMENT OF ANIMAL HEALTH (Katima Mulilo Campus)

☎ (+264 66) 262 6087 ☎ (+264 66) 253 964 ✉ emwenda@unam.na Private Bag 1096, Venela Road, Katima Mulilo, Namibia

Head of Department: Vacant

Associate Professor: Vacant

Senior Lecturer: Dr O. Madzingira: BVSc (University of Zimbabwe); MPhil (University of Zimbabwe); MMedVet (University of Pretoria)

Senior Lecturer: Dr B. Segwagwe: BVSc (University of Zimbabwe); MVSc (University of Melbourne)

Lecturer: Vacant
Lecturer: Vacant
Lecturer: Vacant
Assistant Lecturer: Dr S. Chinyoka: BVSc (University of Zimbabwe)
Technologist: Ms E. Mwenda: BSc Environmental Microbiology (University of Namibia)
Technician: Mr U. Ujava: Dip Agric (University of Namibia)

A. REGULATIONS

The regulations of the Faculty of Agriculture and Natural Resources (FANR) 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**.

A.1 COURSES OF STUDY

The Faculty may offer the following diploma and degree programmes:

A.1.1 UNDERGRADUATE PROGRAMMES

Diplomas

(Code)		Minimum Duration
(17HDAG)	Higher Diploma in Agriculture	3 years full-time
(17HDNR)	Higher Diploma in Natural Resources Management	3 years full-time
(17HDAH)	Higher Diploma in Animal Health	3 years full-time

Degrees

(Code)		Minimum Duration
(17BSAE)	Bachelor of Science in Agriculture (Agricultural Economics) Hons	4 years full-time
(17BSAS)	Bachelor of Science in Agriculture (Animal Science) Hons	4 years full-time
(17BSCS)	Bachelor of Science in Agriculture (Crop Science) Hons	4 years full-time
(17BSFS)	Bachelor of Science in Agriculture (Food Science) Hons	4 years full-time
(17BSFA)	Bachelor of Science in Fisheries & Aquatic Sciences (Hons)	4 years full-time
(17BSIE)	Bachelor of Science in Integrated Environmental Science (Hons)	4 years full-time
(17BSWM)	Bachelor of Science in Wildlife Management & Ecotourism (Hons)	4 years full-time
(17BVET)	Bachelor of Veterinary Medicine (BVM)	6 years full-time

A.1.2 POSTGRADUATE PROGRAMMES

Degree

(Code)		Minimum Duration
(17MSRR)	Master of Science in Rangeland Resources Management	2 years full-time

Apart from the above M Sc Rangeland Resources Management degree programme, the Faculty also Offers M Sc and PhD degree programmes by research and thesis in accordance with the general regulations of the University of Namibia.

A.2 GENERAL ADMISSION CRITERIA FOR UNDERGRADUATE PROGRAMMES:

A.2.1 DIPLOMA PROGRAMMES

A.2.1.1 The normal basic requirement for entrance to Diploma programmes shall be a Namibian Senior Secondary Certificate (NSSC) Ordinary Level Level or a recognized equivalent qualification, provided that a candidate has passed five subjects with a minimum of 22 points on the UNAM Evaluation Point Scale. The following minimum requirements will apply:

- i) English (as a Second Language) with a "D" symbol or better;
- ii) Mathematics with a "D" symbol or better;
- iii) For Higher Diploma in Agriculture: Any two of the following: a minimum "D" symbol Biology; a minimum "D" symbol in Agricultural Science; a minimum "E" symbol in Physical Science (or Chemistry);
- iv) For Higher Diploma in Natural Resources Management: Any two of the following: a minimum "D" symbol Biology; a minimum "D" symbol in Agricultural Science; a minimum "E" symbol in Physical Science or Geography;

- v) For Higher Diploma in Animal Health: Any two of the following: a minimum "D" symbol in Biology; a minimum "D" symbol in Agricultural Science; a minimum "E" symbol in Physical Science (or Chemistry);
- vi) Candidates may also be admitted into the above Higher Diploma Programmes through the Mature Age provision if they meet the following conditions:
 - i) They should be at least 25 years old on the first day of the academic year in which admission is sought;
 - ii) They should have successfully completed junior secondary school education (i.e. grade 10);
 - iii) They should have proof of at least five years of relevant work experience;
 - iv) They should pass all papers of the prescribed Mature Age Entry tests with a minimum of 50%.

A.2.1.2 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 Faculty reserves the right to interview candidates before admission.

A.2.2 UNDERGRADUATE DEGREE PROGRAMMES

A.2.2.1 The University of Namibia General Regulations governing admission of students to first year undergraduate degree programmes shall apply.

A.2.2.2 Notwithstanding the above, candidates wishing to join the following programmes in the Faculty must have obtained the following grades at NSSC Ordinary Level, or its recognized equivalent;

A.2.2.2.1 B Sc in Agriculture (Hons): Candidates must have obtained a "C" symbol in Mathematics and Biology, and at least a "D" symbol in Physical Science, Chemistry or Physics.

A.2.2.2.2 B Sc in Fisheries & Aquatic Sciences (Hons): Candidates must have obtained a "C" symbol in Mathematics and Biology, and at least a "D" symbol in Physical Science, Chemistry or Physics.

A.2.2.2.3 B Sc in Integrated Environmental Science (Hons) and B Sc in Wildlife Management & Ecotourism (Hons): Candidates must have obtained a "C" symbol in Mathematics and Biology, and at least a "D" symbol in Geography, Physical Science, Chemistry or Physics.

A.2.2.2.4 Candidates with a three-year Higher Diploma in Agriculture, Forestry, Natural Resources or Fisheries and Marine/Aquatic Sciences from a recognized and accredited institution may be granted admission to the Faculty's undergraduate degree programmes. Such candidates may be exempted from certain modules in the degree programme provided that equivalent modules were completed with a pass mark of 60% of higher.

A.2.2.3 Admission to the six-year fully-fledged Bachelor of Veterinary Medicine (BVM) Programme requires 30 points from five subjects including a "B" symbol in English, Biology, Mathematics and Physical Science (or Chemistry) at NSSC Ordinary Level or a 3 grade or higher in Mathematics and Physical Science (or Chemistry) at NSSC Higher Level. Candidates with a three-year Higher Diploma in Animal Health or related field with a combined average pass of 70% or higher from a recognized and accredited institution may also be granted admission to the first year the Bachelor of Veterinary Medicine (BVM) degree programme at the discretion of the Faculty.

A.2.2.4 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 Faculty reserves the right to interview candidates before admission.

A.3 **MATURE AGE ENTRY SCHEME FOR UNDERGRADUATE DEGREE AND DIPLOMA PROGRAMMES.**

A.3.1 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.

A.3.2 Candidates who, in the opinion of the examiners, merit further consideration, may be called for an oral interview before the final selection is made.

A.4 **CONDUCT OF THE PROGRAMMES**

A.4.1 First year B.Sc. students admitted into the Faculty will spend the year at the University's Main Campus. The students will continue with their professional training in the second year at Neudamm or Ogongo Campus.

A.4.2 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.

A.4.3 A student may, with the approval of the Faculty and Department, take modules from other Faculties provided that doing so will not affect his or her programme of study.

A.4.4 The following undergraduate Diploma programmes may be offered:

- Higher Diploma in Agriculture (Ogongo Campus);
- Higher Diploma in Natural Resources Management (Ogongo Campus); and
- Higher Diploma in Animal Health (Katima Mulilo Campus)

A.4.5 The following undergraduate degree programmes may be offered:

- B Sc in Agriculture (Agricultural Economics) Hons;
- B Sc in Agriculture (Animal Science) Hons;
- B Sc in Agriculture (Crop Science) Hons;
- B Sc in Agriculture (Food Science & Technology) Hons;
- B Sc in Fisheries & Aquatic Sciences (Hons);
- B.Sc in Integrated Environmental Science (Hons) with the following two options / specializations:
- B Sc in Wildlife Management & Ecotourism (Hons)
- Bachelor of Veterinary Medicine (BVM) – six-year programme

A.4.6 The following M Sc degree programme may be offered:

- Master of Science in Rangeland Resources Management

A.5 **DURATION OF STUDY (UNDERGRADUATE PROGRAMMES)**

A.5.1 Subject to the provisions of Faculty Special Regulations the minimum duration of full-time study for a Bachelor's degree shall normally be four years, and that of the Diploma normally three years.

A.5.2 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.

A.6 **MODULE STRUCTURE AND CODING**

A.6.1 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 & Aquatic Sciences), FST (Food

Science & Technology), IES (Integrated Environmental Science), WLM (Wildlife Management & Ecotourism).

The three alpha codes are followed by four numeric codes denoting the following:

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

A.7 FIELD ATTACHMENT REGULATIONS

- A.7.1 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.
- A.7.2 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.
- A.7.3 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.
- A.7.4 Field Attachment will be assessed based on i) written attachment report and ii) an oral presentation.

A.8 ASSESSMENT

- A.8.1 General Examination Regulations as set out in the General Information & Regulations Prospectus shall apply.
- A.8.2 Unless otherwise stipulated in these regulations, module assessment for the diploma and undergraduate degree programmes will be as follows:

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.

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 lectures and practicals.

- A.8.3 Continuous Assessment will include at least 2 written tests and 1 assignment, including practical reports.

A.9. MINIMUM REQUIREMENTS FOR RE-ADMISSION INTO THE FACULTY

A.9.1 HIGHER DIPLOMA PROGRAMMES

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

- 40 credits by the end of the First Year of which 16 credits must be of a non-UNAM core module;
- 100 credits by the end of the Second Year;
- 196 credits by the end of the Third Year;
- 292 credits by the end of the Fourth Year.

A.9.2 DEGREE PROGRAMMES

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

- 48 credits by the end of the First Year of which 16 credits must be of a non-UNAM core module;
- 120 credits by the end of the Second Year;
- 224 credits by the end of the Third Year;
- 328 credits by the end of the Fourth Year;
- 432 credits by the end of the Fifth Year.

A.10 **ACADEMIC ADVANCEMENT REGULATIONS**

A student advances to the following academic year of study when at least 2/3 of the modules of the curriculum for a specific year have been passed. If a student passed only 1/3 of the full curriculum of a specific year, he/she may not register for any modules of the following year. In all cases, pre-requisites for modules have to be passed before a student can proceed to register for modules that require prerequisites.

A.10.1 DIPLOMA PROGRAMMES

- From Year 1 to 2:
At least 88 credits by the end of the First Year, including a pass in Biology (ASC 2401);
- From Year 2 to 3:
At least 212 credits by the end of the Second Year.

A.10.2 DEGREE PROGRAMMES

- From Year 1 to 2:
At least 96 credits by the end of the First Year, including passes in Introduction to Biology (BLG 3511) and Diversity of Life (BLG 3512);
- From Year 2 to 3:
At least 232 credits by the end of the Second Year;
- From Year 3 to 4:
At least 364 credits by the end of the Third Year, including all First Year modules.

A.11 **AWARDING OF DIPLOMAS AND DEGREES**

A.11.1 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.

A.11.2 The diploma or degree Certificate shall be classified in accordance with the provisions of the Academic General Regulations of the University of Namibia.

B. HIGHER DIPLOMA IN AGRICULTURE (Ogongo Campus) [17HDAG]

B.1 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 PRGOGRAMME CREDITS			388		

B.2 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 description (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 description: 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.

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.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module Title: CONTEMPORARY SOCIAL ISSUES

Code: CSI 3580

NQF: 5

Credits: 8

Prerequisite: None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

responsible leadership. Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoked critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (100%), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics:

Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

PART B: COURSE SPECIFICATION

Course Title: MATHEMATICS AND BASIC STATISTICS	
Course Code	AAEC 2411
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	4 hours lectures per week; 3 hours tutorials alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This modules develops a student's understanding of concepts in the general branches of mathematics. It also introduces students to statistical theory in preparation for research methodology courses	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Carry out simple arithmetic calculations
2. Solve linear and quadratic equations
3. Express and solve geometric and trigonometric relationships
4. Carry out simple analysis of data

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: BIOLOGY	
Course Code	AASC 2431
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	4 hours per week lectures; 3 hours per week practicals for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding of plant, animal and microbial biology as a basis for agricultural science	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Demonstrate understanding of the molecular basis of life
2. Describe plant structure and function
3. Describe animal anatomy and function
4. Carry out taxonomic classification of plants, animals and micro-organisms
5. Demonstrate understanding of basic laws of heredity
6. Describe ecological cycles
7. Demonstrate understanding of agroecosystems

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: FARM DUTIES I	
Course Code	AACA 2400
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	One full day (7 hour day) alternating for 28 weeks
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered	1 and 2
Course Aims	
This module develops a student's skills and attitudes regarding general farm duties. It gives the student practical exposure to all farm operations taking place on the University Farm	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. be competent in driving a tractor and operating tractor-drawn implements and equipment
2. be competent in handling and training draft animals
3. be competent in milking dairy animals and in the storage of dairy products
4. be competent with all crop husbandry practices
5. be competent in feeding all categories of farm animals and in ensuring their hygiene and health

Course 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).

Assessment Strategies

Pass or fail grade. Pass with more than 80 % attendance

Course Title: Basic Economics	
Course Code	AAEC2482
NQF Level	4
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lectures and 2 hours practical per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course introduces the students to basics concepts in microeconomics and macroeconomics and functioning of the economy.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Explain the concept of resource scarcity
2. Explain the concepts of demand and supply, production theory, consumer theory and choice under uncertainty
3. Discuss the concept of theory of the firm and differentiate between the market structures
4. Explain the concept of general equilibrium analysis, externalities and public goods
5. Describe Key macroeconomic models, variables and use the theory to predict the movements of the key economic indicators

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: PHYSICAL SCIENCE	
Course Code	AASC 2432
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	4 hours per week lectures; 3 hours practical for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding of the basic concepts of physics and chemistry	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. carry out calculations of stoichiometric quantities of chemical reagents and products
2. describe the major groupings of biological compounds and their properties
3. carry out calculations of motion, current, force, power and energy
4. explain the different types of energy and their inter-convention

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: ANIMAL ANATOMY, PHYSIOLOGY AND REPRODUCTION	
Course Code	AASC 2422
NQF Level	4
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures per week; 3 hours practical alternate week for 14 weeks
Co-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Describe the anatomy of various categories of livestock and poultry
2. Describe reproductive processes in livestock and poultry
3. Carry out proper dissections of livestock and poultry in order to observe their anatomy
4. Make and stain good histological slides

Course 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 covered in this Module.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

SECOND YEAR MODULES

Course Title: FARM DUTIES II	
Course Code	AACA 2500
NQF Level	5
Notional Hours	160
NQF Credits	16
Contact hours	One full day (7 hour day) alternating for 28 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
This module further develops a student's skills and attitudes regarding general farm duties. It gives the student practical exposure to all farm operations taking place on the University Farm	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. be competent in driving a tractor and operating tractor-drawn implements and equipment
2. be competent in handling and training draft animals
3. be competent in milking dairy animals and in the storage of dairy products
4. be competent with all crop husbandry practices
5. be competent in feeding all categories of farm animals and in ensuring their hygiene and health

Course 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).

Assessment Strategies

Pass or fail grade. Pass with more than 80 % attendance

Course Title: Communication and Information Systems	
Course Code	AAEC 2541

NQF Level	5
Notional Hours	8
NQF Credits	8
Contact hours	2 lecture hour per week and practical 2 hours alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course exposes students to concept of channels of communication; importance of group dynamics, techniques and different leadership styles	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Explain the importance of communication and main elements of communication process
2. Distinguish appropriate oral and written communication techniques for agricultural work
3. Identify and make use of appropriate communication methods and/ audio visual aids
4. Design communication materials
5. Analyze and Manage conflict and negotiations at work place

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: Financial Management	
Course Code	AAEC 2501
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course exposes students to the concepts and tools of financial management and analysis in agribusiness and farming.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Compile and compare financial statements (balance sheets, income statements and cash flows)
2. Assess viability of planned farm activities and carry out investment analysis
3. Explain the importance of capital in agriculture, time value of money, the concepts of capital structure, leverage and financial risk.
4. Analyse how farmers cope with risk and uncertainty in agriculture
5. Conduct financial planning and feasibility analysis

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: Introduction to Rural Sociology	
Course Code	AAEC 2521
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course provides students with the basic sociological concepts and their application to agricultural and rural development	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Analyse the significance of rural sociology to agricultural extension and rural development as well as different cultures
2. Compare rural and urban communities and the implications of rural urban migration;
3. Discuss role of social institutions in agriculture and rural development; social change, gender analysis
4. Appreciate the importance of indigenous knowledge in research process
5. Discuss the impact of HIV/AIDS on agricultural production

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: SOIL SCIENCE	
Course Code	ACSC 2581
NQF Level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lectures per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module aims to develop the student's understanding of soil as a medium for plant growth.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Recognize and identify different soil texture
2. Describe the basic interaction of soil fertility and plant nutrition
3. Employ soil sampling methods
4. Describe soil water and plant relationships

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: APPLIED ANIMAL HEALTH	
Course Code	AASC 2551
NQF Level	5
Notional Hours	160
NQF Credits	16
Contact hours	4 lectures per week; 3 hours practicals for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding of livestock and poultry diseases in Namibia and his/her skills in diagnosing and treating them	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Describe the development and epidemiology of common livestock and poultry diseases in Namibia
2. Discuss common diseases of categories of livestock in Namibia
3. Restrain livestock and obtain disease specimens
4. Correctly administer drugs to livestock and poultry for diagnoses diseases

Course 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 caused 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: INTRODUCTION TO RESEARCH	
Course Code	ACSC 2582
NQF Level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lectures per week; 3 hours practicals/tutorials alternate week for 14 weeks

Prerequisite	AAEC 2411 Mathematics and Basic Statistics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module introduces students to concepts of statistics, agricultural experimentation and social research. It prepares students to analyse experiments and present findings in formats that are understandable to other researchers and the public	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Demonstrate understanding of scientific research methodology
2. Carry out basic statistical calculations
3. Formulate research questions, design data collection methods.

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: WORKSHOP TECHNOLOGY, SURVEYING AND FARM STRUCTURES	
Course Code	ACSC 2522
NQF Level	5
Notional Hours	80
NQF Credits	8
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
Course Aims	
This module introduces students to basics of workshop machinery and environment. It also introduces students to the basics of land survey and farm structures	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Apply workshop techniques to make farm machinery components
2. Describe basic surveying techniques
3. Generate and interpret surveying variables
4. Identify building materials for various farm structures
5. Describe procedures for installation of water, electricity and sewerage systems in farm structures

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: VEGETABLE AND FRUIT PRODUCTION	
Course Code	ACSC 2532
NQF Level	5
Notional Hours	160
NQF Credits	16
Contact hours	4 hours lectures per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding of principles and practices employed in the production of vegetables and fruits.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Describe climatic and soil conditions required for different fruit and vegetable species
2. Plan, establish and manage a vegetable and fruit nursery
3. Select vegetable cultivars suitable to seasons and locations
4. Explain and practice the different management practices required by different fruit and vegetable species
5. Describe the important aspects of mushroom production

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: CROP PRODUCTION	
Course Code	ACSC 2592
NQF Level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lecture per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding of the principles and practices of field crop production in Namibia	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Distinguish among crop production systems
2. Identify and discuss land preparation methods
3. Describe crop management practices

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment) Examination 40% (1 x 2 hour paper)

Course Title: APPLIED ANIMAL BREEDING	
Course Code	AASC 2502
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 lecture per week; 3 hours practicals alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding of the applications of quantitative genetics to animal breeding	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Carry out calculations of gene frequencies and heritability
2. Discuss application of quantitative genetics to livestock improvement
3. Discuss breeding values and their application to livestock and poultry improvement

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

THIRD YEAR MODULES

Course Title: SPECIAL STUDY	
Course Code	AACA 2600
NQF Level	6
Notional Hours	160
NQF Credits	16
Contact hours	32
Prerequisite	
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
The Special Study aims to introduce students to basic research skills such as proposal and report writing; oral presentations; data collection and analysis; experimental design.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Demonstrate basic understanding of statistics
2. Demonstrate research problem solving methodology
3. Demonstrate knowledge and skill of using computers in research report writing
4. Give an oral presentation of a research project and a research report

Course 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.

Assessment Strategies

Research proposal write-up (20 %), presentation of the research proposal in seminar (10 %), presentation of empirical findings in a second seminar (10%), and final report (60 %).

Course Title:	FIELD ATTACHMENT
Course Code	AACA 2601
NQF Level	6
Notional Hours	80
Contact hours	6 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module is designed to further expose students to practical experience of actual operations on farms, agro-industries, and research institutions in Namibia	

Learning Outcomes/Specific Outcomes

Upon completion of this course, the student should be able to:

1. Demonstrate the attainment of practice-oriented experiences beyond the classroom in executing high quality crop, livestock and poultry management activities
2. Increase interaction with key agronomic role players and/or public service activities designed to enhance food, agricultural and natural resource system

Course 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.

Methods of Facilitation of Learning

The course will be facilitated through the following learning activities:

On-job training and mentorship approach; apply knowledge and concepts through problem solving; 100% attendance and participation; compulsory practicals, seminars and field visits; use and synthesize available materials and other resources; work effectively both individually and in groups; uphold academic integrity; supervisor consultations promoted; evaluate course delivery.

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.

Course Title: Principles of Agricultural Extension	
Course Code	AAEC 2641
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures and 2 hr practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course exposes students to concepts, theory and principles of extension, their role and application in agricultural extension and sustainable agricultural development	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Understand the need for extension with particular reference to its role in sustainable agricultural development.
2. Analyse the various methods and approaches to agricultural extension
3. Understanding the elements of diffusion and innovations
4. Understand motivational theory (Maslow's Hierarchy of needs)
5. Plan, design and implement an extension programme

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: Agricultural Marketing and Policy	
Course Code	AAEC 2661
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 lectures per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course 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	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Define basic agricultural marketing concepts and principles
2. Describe approaches and functions of marketing
3. Explain pricing methods, alternatives and strategies for agricultural products
4. Perform food supply chain analysis
5. Discuss the importance of government policy intervention in agricultural marketing and the impact of international agricultural trade policies

Course content:

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, futures 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: INTENSIVE ANIMAL PRODUCTION	
Course Code	AASC 2681
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact Hours	03 Lecture hours / week for 14 weeks; 03 Practical hours / weeks alternating for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course develops the students' understanding of pig, dairy and poultry production.	

Learning Outcomes:

Upon successful completion of this module, students should be able to:

1. Discuss the management of pigs, dairy cattle and poultry for profitable production.
2. Outline the selection criteria of breeding animals.
3. Describe the methods used to assess product quality.
4. Incubate eggs and discuss the incubation of eggs confidently.
5. Process meat.

Course Content:

Pig production in Namibia, Pig breeds & production systems. The pig cycle and the management of pigs. Marketing, 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

Assessment Strategies

Continuous Assessment: 60 % (2x assignments + 2 tests + at least 5 marked practicals); Exam: 40% (1 x 2 hr paper)

Course Title: WATER MANAGEMENT AND SOIL CONSERVATION	
Course 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
Course Aims	
This course develops a student's understanding of irrigation crop water requirements and the process of soil erosion	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Identify and describe the different types of erosion in Namibia and their control
2. Describe sources, storage, uses and quality of water in Namibia
3. Identify types of irrigation methods and the suitability of land for irrigation
4. Determine crop water requirements
5. Describe the determination of irrigation application rate and scheduling

Course 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)

Course Title: RANGE MANAGEMENT	
Course Code	AASC 2691
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	3 lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course aims to develop 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.	

1. Upon successful completion of this module, students should be able to:
2. Construct modes of plant succession using known models & theories.
3. Demonstrate how you would successfully establish cultivated pastures.
4. Identify range plants and, discuss their roles on range, proneness to defoliation and the conservative grazing management you would adopt for all.
5. Carry out range carrying capacity determination.
6. Advise producers on rangeland rehabilitation.

Course 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.

Assessment Strategies

Continuous Assessment: 60% (2x assignments + 2 tests + at least 5 marked practicals); Exam: 40% (1 x2 hr paper)

Course Title: Project Management	
Course Code	AAEC 2602
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 hours of lectures per week and 2 hour practical alternate week 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course exposes students to principles and applications of project planning and management in agriculture.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Describe the project cycle and management concepts
2. Identify and formulate plans of sound agricultural projects among alternative development opportunities which are likely to accelerate economic development most rapidly;

3. Identify project benefits and target groups and weaknesses and risks and provide remedial measures
4. Use economic and financial analysis techniques to evaluate projects.
5. Manage and monitor agricultural projects.

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: ANIMAL NUTRITION AND FEEDING	
Course Code	AASC 2622
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures per week; 3 hours practicals alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding of animal feeds and his/her skills in making feed ratios	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Describe digestibility and metabolism of animal feeds
2. Discuss the nutritional composition of common animal feeds in Namibia
3. Formulate animal feeds using available feedstuffs in Namibia

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: Entrepreneurship	
Course Code	AAEC 2622
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures and 2 hrs practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course introduces students to the concepts of entrepreneurship	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Explain the characteristics of an entrepreneur, entrepreneurial process and its importance, and role of entrepreneurship in the economy
2. Differentiate types of business organization
3. Discuss major strategic management issues
4. Analyse the major factors in business opportunity identification
5. Carry out feasibility studies/SWOT analysis
6. Prepare a business plan

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: GAME FARMING	
Course Code	AASC 2602
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours per week lectures; 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module introduces students to game ranching and conservancy management	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Discuss game management in Namibian conservancies
2. Discuss the suitability of land and climatic environment for game farming
3. Discuss national regulatory policies for game farming

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: EXTENSIVE ANIMAL PRODUCTION	
Course Code	AASC 2642
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures; 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered	2
Course Aims	
This module develops a student's understanding and skills regarding cattle ranching, sheep and goat production	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Discuss the management of beef cattle sheep and goats for profitable production.
2. Outline the selection criteria of breeding animals.
3. Describe the methods used to assess product quality.
4. Discuss formation and composition of muscle in beef cattle, sheep and goats

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: FARM POWER AND MACHINERY	
Course Code	ACSC 2682
NQF Level	6
Notional Hours	120
NQF Credits	12
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
Course Aims	
This module develops a student's understanding of farm power sources and farm machinery	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Identify and explain different sources of farm power
2. Describe the importance and development of draft animal power in Namibia
3. Describe the operation, calibration and maintenance of farm machinery and implements, crop storage, handling and processing equipment.
4. Select farm machinery for specific purposes
5. Identify and describe different drying methods, farm storage and processing of agricultural crops.

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: CROP PROTECTION	
Course Code	ACSC 2622
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures per week, 3 hours practical alternate week
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course develops a student's understanding of insect pests, nematodes, diseases of plants and their control in an environmentally friendly manner	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Discuss importance of crop protection
2. Differentiate among crop protection methods and their applications
3. Describe disease incidence, pest and weed infestation and control
4. Collect and classify pests, diseases and weeds of agricultural importance
5. Describe international code of conduct on safe use and distribution of pesticides

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

**C. HIGHER DIPLOMA IN NATURAL RESOURCES MANAGEMENT (Ogongo Campus)
[17HDNR]**

C.1 PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory(C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
ULEG2410	English for General Communication	4	16	C	
UCLC3509	Computer Literacy	5	8	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
AAEC2411	Mathematics and Basic Statistics	4	16	C	
AASC 2431	Biology	4	16	C	
Total Credits Semester 1					64
Year 1 Semester 2					
ULEG2410	English for General Communication	4	16	C	
AIES2402	Nursery Management	4	8	C	
AIES 2422	Plant Taxonomy	4	8	C	
AIES2442	General Ecology	4	8	C	
AAEC2482	Basic Economics	4	12	C	
AASC2432	Physical Science	4	16	C	
Total credits Semester 2					68
TOTAL CREDITS YEAR 1					132
Year 2 Semester 1					
AIES2531	Introduction to Agroforestry	5	16	C	None
AIES2551	Forest and Veld Fire Management	5	16	C	None
AAEC2501	Financial Management	5	8	C	None
AAEC2521	Introduction to Rural Sociology	5	8	C	None
AAEC 2541	Communication and Information Systems	5	8	C	None
ACSC2581	Soil Science	5	12	C	None
Total Credits Semester 1					68
Year 2 Semester 2					
AIES2582	Vegetation Assessment & Monitoring Techniques	5	12	C	None
AIES 2502	Plant Pathology	5	8	C	None
AIES2542	Silviculture	5	8	C	AIES 2402 (Nursery Management)
AIES 2562	Applied Entomology	5	8	C	None
ACSC 2582	Introduction to Research	5	12	C	AAEC 2411 (Basic Mathematics & Statistics)
ACSC 2592	Crop Production	5	12	C	None
Total credits Semester 2					60
TOTAL CREDITS YEAR 2					128
Year 3 Semester 1					
AIES 2651	Natural Resources Policies and Administration	6	16	C	None
AIES 2671	Forest Products & Services	6	16	C	None
AAEC2641	Principles of Agricultural Extension	6	8	C	None
ACSC2601	Water Management and Soil Conservation	6	8	C	AACSC 2581 Soil Science
AACA2601	Field Attachment	6	8	C	None
AASC2600	Special Study	6	8	C	ACSC 2582 (Intro to Research)
Total Credits Semester 1					64
Year 3 Semester 2					
AIES 2632	Natural Resource Management	6	16	C	None
AIES 2652	Principles of Wildlife Management	6	16	C	None

AIES 2672	Economics of Natural Resources	6	16	C	None
AAEC2602	Project Management	6	8	C	None
A ASC2600	Special Study	6	8	C	AASC 2582(Introduction to Research)
Total credits Semester 2					64
TOTAL CREDITS YEAR 3					128
TOTAL CREDITS FOR THE PROGRAMME					388

C.2 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 description (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 description: 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.

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.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module Title:	CONTEMPORARY SOCIAL ISSUES
Code:	CSI 3580
NQF:	5
Credits:	8
Prerequisite:	None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches

that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will undergird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

responsible leadership. Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

- ❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes

of assessment (**100%**), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics:Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable

development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

Course Title: MATHEMATICS AND BASIC STATISTICS	
Course Code	AAEC 2411
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	4 hours lectures per week; 2 hours tutorials per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: BIOLOGY	
Course Code	AASC 2431
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	4 hours per week lectures; 3 hours per week practicals for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: PHYSICAL SCIENCE	
Course Code	AASC 2432
NQF Level	4
Notional Hours	160
NQF Credits	16
Contact hours	4 hours per week lectures; 3 hours practical per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 3 hour paper)

Course Title: Basic Economics	
Course Code	AAEC2482
NQF Level	4
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lectures and 2 hours practical per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

COURSE TITLE: NURSERY MANAGEMENT	
Code	AIES 2402
NQF level	4
Notional Hours	80
NQF Credits	8
Contact hours	2 hours of lectures per week, 3 h practicals alternate week
Prerequisites	None
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction to silviculture. Forest nurseries. Types of forest nurseries: permanent, temporary, satellite and flying nurseries. Selection of nursery site. Seedlings growing media. Seed technology: history of seed production, forecasting seed yield, seed collection and extraction, seed testing, computation of seeds requirements and seed storage. Seed sowing. Vegetative propagation: definition, types and techniques of vegetative propagation. Nursery tending operation. Nursery protection. Seedling distribution. Nursery records. Nursery planning, work organization and administration.

Assessment strategies

Continuous assessment 60% (minimum 2 tests, 2 assignments, 5 assessed practicals); Examination 40% (1 x 2 hour theory paper).

COURSE TITLE: PLANT TAXONOMY	
Code	AIES 2422
NQF level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 hours of lectures per week, 3 h practicals per week
Prerequisites	General Biology
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction to botanical concepts and plant anatomy. Plant taxonomy; classification and nomenclature. Plants identification; trees, shrubs and herbs. Botanical keys; types and use. Major plant families in Namibia and Specimen collection; Fabaceae (3 sub-families), Euphorbiaceae, Rubiaceae, Combretaceae.

Assessment strategies

Continuous assessments 60% (minimum 2 tests, 4 assessed practical and 1 assignment); Examination 40% (1 x 2 hour theory paper).

COURSE TITLE: GENERAL ECOLOGY	
Code	AIES2442
NQF level	4
Notional Hours	80
NQF Credits	8
Contact hours	2 hours of lectures per week, 3 h practicals alternate week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction to ecology: Concepts of ecology. Ecosystems of arid zones: terrestrial, freshwater and marine. Biomes of Southern Africa: physical and climatic characteristics. Constituents of the ecosystem: Biotic and abiotic components. Nutrient cycles: Food chain, Nitrogen cycle, Phosphorus cycle and carbon cycle. Plant succession and ecosystem disturbance. Ecosystem maintenance/conservation.

Assessment strategies

Continuous assessments 60% (Minimum 2 tests, 3 practical, 1 assignment); Examination 40% (1x2 hour theory paper).

COURSE TITLE: INTRODUCTION TO AGROFORESTRY	
Code	AIES2531
NQF level	5
Notional Hours	160
NQF Credits	16
Contact hours	4 hours of lectures per week, 3 hours of practicals per week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	1

Course content

Introduction to agroforestry: Definition and principles of agroforestry, integrated land-use system, need for agroforestry, cause and consequences of deforestation. Multi-purpose tree species and their uses. Agroforestry systems. Agroforestry establishment techniques; ecological and economic interactions. Indigenous fruit trees. Agroforestry project work. Principles of beekeeping: biology of honeybees, beekeeping management, honey and other bee products. Crop pollination, bee diseases, parasites and poisoning of honeybees and their control.

Assessment strategies

Continuous assessments 60% (2 tests, 4 practical reports, and 2 assignments); Examination 40% (1 x 3 hours paper).

COURSE TITLE: FOREST AND VELD FIRE MANAGEMENT	
Code	AIES2551
NQF level	6
Notional Hours	160
NQF Credits	16
Contact hours	4 hours of lectures per week, 3 hours practicals per week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	1

Course content

Introduction to veld and forest fires: definition of veld and forest fires, significance of veld and forest fires in savanna management, Forest fire and the environment: causes of fires, types of fires, effects of fire, forest fuels, fire behaviour, fire danger rating system, rate of spread, parts of veld and forest fire, classification of veld and forest fires. Fire prevention: community participation in fire prevention, early controlled burning, principles of fire breaks and fire break maintenance, fire protection plan. Fire detection: general detection, organized detection, fire lookout personnel, communication. Fire suppression: Tools, equipment and techniques, phases of fire suppression tactics, basic rules of fire suppression tactics, methods of fire attack, factors affecting choice of attack, principle techniques for fire line construction, fire reports and records. Uses of fire in forest and range management: protective tool, land clearing, grazing, other uses. Fire control organization: functions of fire control section, personnel and their specific duties, the Government and other stakeholders. Safety and survival methods: general safety measures, accident prevention, fire fighting safety rules, dangerous situations, welfare of the fire fighting crew.

Assessment strategies

Continuous assessment 60% (minimum 2 tests, 1 assignment, 2 graded practical, 1 field trip report, 1 fire management plan). Examination 40% (1 x 3 hours theory paper).

Course Title: Introduction to Rural Sociology	
Course Code	AAEC 2521
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: Communication and Information Systems	
Course Code	AAEC 2541
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 lecture hour per week and practical 2 hours alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: Financial Management	
Course Code	AAEC 2501
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title: SOIL SCIENCE	
Course Code	ACSC 2581
NQF Level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lectures per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

COURSE TITLE: VEGETATION ASSESSMENT AND MONITORING TECHNIQUES	
Code	AIES2582
NQF level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours of lectures per week, 2 hour practicals per week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction to vegetation assessments and inventory. Vegetation assessment: sampling: line transects, plot sampling: circular plots and quadrats; diversity indices; designs; result reporting. Forest mensuration systems, concepts and models. Tree measurement: measurement and computation of tree characteristics. Stand measurement. Inventories in large forest areas: Use Natural resource assessment methods to quantify and monitor changes in natural resources; Introduction to the use of Geographic Information System (GIS) tool for natural resource assessment.

Assessment strategies

Continuous assessments 60% (minimum 2 tests, 3 assessed practical, 1 inventory report); Examination 40% (1x2 hour theory paper).

COURSE TITLE: PLANT PATHOLOGY	
Code	AAIES 2502
NQF level	5
Notional Hours	8
Contact hours	2 hour of lectures per week, 3 hour practicals alternate week
NQF Credits	8
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction to Plant Pathology. Non-infectious agents: Biology and diseases. Infectious agents: Biology and diseases. Concept of disease development. Disease identification. Diseases caused by fungi, bacteria and viruses. Common plant diseases in Namibia. Beneficial microorganisms. Disease prevention and control (management practices). Plant diseases and trading of plants and plant products.

Assessment strategies

Continuous assessments 60% (Minimum 2 tests, 4 graded practical reports, and 2 assignments). Examination 40% (1 x 2 hours paper).

COURSE TITLE: SILVICULTURE	
Code	AIES2542
NQF level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 hour of lectures per week, 3 hour practicals alternate week
Prerequisites	AIES 2402: Nursery Management
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction: definitions and concepts, importance of establishing and tending of trees and forests. Land preparation methods. Forest establishment techniques. Weeding operations. Pruning operation.

Thinning operation: reasons for thinning, thinning intensity and timing, thinning regimes, methods of thinning. Introduction to silvicultural systems: forms and composition of stands. Factors affecting the selection of a silvicultural system. Indigenous knowledge methods and their role in tending and management of indigenous trees and forests for better growth.

Assessment strategies

Continuous assessments 60% (2 tests, 4 practical reports, and 2 assignments; Examination 40% (1 x 3 hours paper).

COURSE TITLE: APPLIED ENTOMOLOGY	
Code	AIES 2562
NQF level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hour of lectures per week, 3 hour practicals alternate week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction to Applied Entomology. General insect biology. Insect classification. Insects as pests. Assessment of insect population dynamics. Damage caused by insects/pests. Insects/pests in Namibian Forests. Beneficial insects. Preventive and control measures. Integrated pest management. Pests and trading of plants and plant products.

Assessment strategies

Continuous assessments 60% (Minimum 2 tests, 3 graded practical, and 1 assignment); Examination 40% (1 x 2 hour theory paper)

Course Title: INTRODUCTION TO RESEARCH	
Course Code	ACSC 2582
NQF Level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lectures per week; 3 hours practicals/tutorials alternate week for 14 weeks
Prerequisite	AAEC 2411 Mathematics and Basic Statistics
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment): Examination 40% (1 x 2 hour paper)

Course Title: CROP PRODUCTION	
Course Code	ACSC 2592
NQF Level	5
Notional Hours	120
NQF Credits	12
Contact hours	3 hours lecture per week, 3 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory

Semester Offered	2
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Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

THIRD YEAR MODULES

COURSE TITLE: NATURAL RESOURCE POLICIES AND ADMINISTRATION	
Code	AAIES2651
NQF level	6
Notional Hours	160
NQF Credits	16
Contact hours	4 hour of lectures per week, 3 hour practicals alternate week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Definition of terms: Principal legislation, Subsidiary legislation, Act, policy, law, work plan. Objectives and strategies of formulating the policy. Introduction to the provisions of natural resources policies, laws and international conventions (emphasis Nature Conservation Act, Mining, Forest Act, Environmental Management Act and land reform acts; UN Conventions relating to natural resource conservation). Provision of natural resource regulations and procedures. Natural Resource policies and politics: Case studies from Namibia. Indigenous laws of Namibia related to environment conservation.

Assessment strategies

Continuous assessments 60% (minimum of 2 tests, 2 practical reports, and 2 assignments); Examination 40% (1 x 3 hours theory paper).

COURSE TITLE: FOREST PRODUCTS AND SERVICES	
Code	AAIES 2671
NQF level	6
Notional Hours	160
NQF Credits	16
Contact hours	4 hours of lectures per week, 3 hours practicals per week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	1

Course content

INTRODUCTION: definitions of forests and related landscapes, wood forest products, non-wood forest products (NWFPs) and services; Contribution of forest products and services to local, national and international economy and trade.

FOREST PRODUCTS: Wood products harvesting techniques, extraction methods and processing in Namibia and in the world with special references to wood products in Namibia such as (fuelwood, charcoal and other wood energy, industrial round wood, sawn wood, pulpwood, particles and other industrial roundwood, fencing and other construction poles, handicrafts and traditional implements); Factors affecting harvesting, transportation system and processing of wood products (economic,

social, political and environmental). Consumption rate of selected forest products (fuel wood, poles, etc)

NON-WOOD FOREST PRODUCTS (NWFPs): Contribution to household economy, local economy and food security (animal origin (food, medicine), plant origin (food and medicine), handcrafts, fodder); Factors affecting the development of indigenous natural products (INPs) and trade; Utilization and value addition of selected INPs (Devil's claw, marula fruit, hoodia plant, melons seed, *Ximenia* fruit, etc) FOREST SERVICES: Eco-tourism, recreation, spiritual and cultural uses; Environmental services: environmental protection of fragile ecosystems (drylands and uplands), combating desertification, watershed management, climate change (carbon sequestration), and biodiversity conservation.

Assessment strategies

Continuous assessments 60% (Minimum of 2 tests, 4 graded practical reports, and 2 assignments); Examination 40% (1 x 3 hours theory paper).

Course Title: WATER MANAGEMENT AND SOIL CONSERVATION	
Course Code	ACSC 2601
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures per week, 3 hours practical alternate weeks for 14 weeks
Prerequisite	ACSC 2581 Soil Science
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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)

Course Title: Principles of Agricultural Extension	
Course Code	AAEC 2641
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	2 hours lectures and 2 hours practical alternate week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

Course Title:	FIELD ATTACHMENT
Course Code	AACA 2601
NQF Level	6
Notional Hours	80
Contact hours	6 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

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.

Course Title: SPECIAL STUDY	
Course Code	AACA 2600
NQF Level	6
Notional Hours	160
NQF Credits	16
Contact hours	2 hours per week for 28 weeks
Prerequisite	ACSC 2582: Introduction to Research
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Course 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.

Assessment Strategies

Research proposal write-up (20 %), presentation of the research proposal in seminar (10 %), presentation of empirical findings in a second seminar (10%), and final report (60 %).

COURSE TITLE: NATURAL RESOURCES MANAGEMENT	
Code	AAIES 2632
NQF level	6
Notional Hours	160
NQF Credits	16
Contact hours	4 hours of lectures per week, 3 hours practicals per week
Prerequisites	
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction: definition and approaches; community, natural resources, resource integration and planning. Rural development and rural livelihood strategies. Natural resource management; Processes and procedures for community forestry, conservancy initiative formations. Policy and strategy frames relevant to community forestry and conservancies; Conflict management over natural resource use. Integrated natural resource management plan; concept and approaches, components and their interactions (land, water, forests, water, non-wood products and services). Methods and processes for integrated natural resource management plan formulation for water, rangelands and forests. Evaluation and monitoring methods for integrated natural resource management plan.

Assessment strategies

Continuous assessments 60% (minimum 2 tests, 4 practical reports, and 2 assignments); Examination 40% (1 x 3 hours theory paper).

COURSE TITLE: PRINCIPLES OF WILDLIFE MANAGEMENT	
Code	AAIES 2652
NQF level	6
Notional Hours	160
NQF Credits	16
Contact hours	4 hours of lectures per week, 3 hours practicals per week
Prerequisites	None
Compulsory/Elective	Compulsory
Semester offered	1

Course content

An introduction to basic principles used in the management of wildlife populations, their habitats and their human users. General concepts in: ecological processes; population dynamics and structure; sampling in wildlife; life history patterns, biotic and abiotic factors structuring wildlife populations and endangered species. Home range and territoriality; coloniality; mating systems; hierarchy. Response of wildlife to humans. Plant-herbivore system. Herbivore-carnivore system. Predation of domestic animals by wild animals. Nutritional ecology (anatomy and physiology; feeding ecology; diet composition and analysis; nutritional value of plants; plant chemicals and toxins; management of toxic plants and affected game; grazing and browsing capacity; mineral deficiencies and supplementary feeding; nutrition in captivity). Animals and their characteristics. Management techniques of wildlife. Rangeland management (principles And practices; inter-relationships between plant species, common range plants, cultivated pastures and fodders). Survey & Monitoring Techniques: atlasing, mapping method, line transect method, point count method, trap-retrap method; biases and errors; environmental variables.

Assessment strategies

Continuous assessment: 60% (at least three assessments); Exam: 40% (1 x 3 hr paper)

Quality assurance arrangements

- Internal and external moderation of exam papers and scripts,
- Peer review of course outlines and teaching
- Student evaluation
- Regular review of course content
- Effective and efficient supervision and monitoring assignment, tests and exams

COURSE TITLE: ECONOMICS OF NATURAL RESOURCES	
Code	AAIES2672
NQF level	6
Notional Hours	160
NQF Credits	16
Contact hours	4 hours of lectures per week, 3 hours practicals alternate week
Prerequisites	AAEC 2482: Basic Economics
Compulsory/Elective	Compulsory
Semester offered	2

Course content

Introduction of natural resources economics. Classification of resources. Review of economic principles: scarcity, opportunity and environmental cost, costs of production, types of capital in relation to natural resources., price formation, capital and interest, depreciation. Economic analysis: Investment analysis, productivity, economic efficiency, uncertainty. Economic valuation of natural resources products and services; valuation techniques and surrogate markets; natural resources contribution to the national economy.

Assessment strategies

Continuous assessments 60% (minimum of 2 tests, 4 practical reports, and 2 assignments); Examination 40% (1 x 2 hours theory paper).

Course Title: Project Management	
Course Code	AAEC 2602
NQF Level	5
Notional Hours	80
NQF Credits	8
Contact hours	2 hours of lectures per week and 2 hour practical alternate week 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1

Course 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.

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment); Examination 40% (1 x 2 hour paper)

D. HIGHER DIPLOMA IN ANIMAL HEALTH (17HDAH) – Katima Mulilo Campus

D.1 PROGRAMME SCHEDULE

YEAR 1 (144 CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
LEG 2410	English for General Communication	4	04/56	0	16		
CSI 3580	Contemporary Social Issues	5	01/14	0	4		
CLC 3509	Computer Literacy	5	02/28	0	8		
DAH 2401	Fundamentals of Physical Sciences	4	02/28	21	8		
DAH 2411	Principles of Biology	4	04/56	42	16		
DAH 2431	Applied Mathematics and Basic Statistics	4	04/56	28	16		
Total semester 1 credits:					68		

Semester 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
LEG 2410	English for General Communication	4	04/56	0	16		
CSI 3580	Contemporary Social Issues	5	01/14	0	4		
DAH 2402	Veterinary Paraprofessional Skills	4	02/28	0	8		
DAH2412	Animal Anatomy I	4	04/56	42	16		
DAH 2432	Animal Physiology I	4	04/56	0	16		
DAH 2452	Basic Animal Behaviour, Handling and Welfare	4	04/56	21	16		
Total Semester 2 credits:					76		

YEAR 2 (144 CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
DAH 2501	Basic Veterinary Parasitology	5	02/28	21	8	DAH 2411	
DAH 2511	Animal Anatomy II	5	04/56	42	16	DAH 2412	
DAH 2531	Animal Physiology II	5	04/56	0	16	DAH 2432	
DAH 2551	Infectious Diseases I	5	04/56	42	16	DAH 2411	
DAH 2571	Basic Pharmacology and Toxicology	5	04/56	21	16	DAH 2432	
Total semester 1 credits:					72		

Semester 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
DAH 2502	Infectious Diseases II	5	02/28	21	8		DAH 2551
DAH 2522	Research Methods	5	02/28	0	8	DAH 2431	
DAH 2512	Animal Pathology	5	04/56	42	16	DAH 2412; DAH 2432	DAH 2511; DAH 2531
DAH 2532	Animal Production and Reproduction	5	04/56	42	16		
DAH 2552	Animal Nutrition	5	04/56	42	16		
DAH 2509	Field Attachment (Animal Production)	5	2 weeks		8		
Total semester 2 credits:					72		

YEAR 3 (128 CREDITS)

Semester 1 and 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
DAH 2600	Special Project	6	07/98		16	DAH 2522	

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
DAH 2601	Legislation and Jurisprudence	6	02/28	0	8		
DAH 2621	Introduction to Veterinary Epidemiology	6	02/28	14	8	DAH 2431	
DAH 2641	Herd and Flock Health Management	6	02/56	21	8		
DAH 2661	Introduction to Veterinary Public Health	6	02/56	21	8		
In addition to the above students in the Animal Health Technician option will cover the following modules							
VAT 2601	Veterinary First Aid	6	02/28	21	8		
VAT 2611	Animal Health Extension	6	04/56	42	16	DAH 2532 DAH 2552	
In addition to the above students in the Laboratory Technologist option will cover the following modules							
VVT 2601	Laboratory Biosafety and Biosecurity	6	02/28	21	8		
VVT 2611	Laboratory Techniques	6	04/56	42	16	DAH 2431	
Total semester 1 credits:					56		

Semester 2: Rotations

I. Animal Health Technician option

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
VAT 2682	Para-Professional Rotations AHT	6	10 weeks		56	All 1 st and 2 nd year modules	
Total semester 2 credits:					56		

II. Laboratory Technologist option

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
VVT 2682	Para-Professional Rotations LT	6	10 weeks		56	All 1 st and 2 nd year modules	
Total semester 2 credits:					56		

TOTAL PROGRAMME CREDITS: 416

MINIMUM REQUIREMENTS FOR RE-ADMISSION INTO THE FACULTY

A student will not be re-admitted into the Faculty if she/he has not passed at least:

- 48 credits by the end of the 1st year of registration (of which at least 16 credits must be non-UNAM core)
- 128 credits at the end of the 2nd year of registration
- 240 credits at the end of the 3rd year of registration
- 320 credits at the end of the 4th year of registration

ADVANCEMENT AND PROGRESSION RULES

A student shall advance to the next year of the study when the following minimum number of credits has been passed:

- From Year 1 to Year 2: at least 112 credits
- From Year 2 to Year 3: at least 240 credits

In addition, the following registration regulations will apply:

- A student who has gained re-admission, but failed to progress to the next year of study, will be allowed to register for selected modules from the next level in addition to the failed modules, subject to the regulations on the maximum number of credits per year and provided that all pre-requisites are met.

D.2 MODULE DESCRIPTORS

FIRST YEAR MODULES

Module Title: ENGLISH FOR GENERAL COMMUNICATION	
Module Code	LEG 2410
NQF Level	4
Contact hours	Lectures: 4 x 1hr L/wk for 28 weeks (56hrs)
NQF Credits	32
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Module Aims	
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 task in academic environment.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Write effectively and accurately within an academic context;
- Follow the conventions of academic writing;
- Read critically and effectively;
- Access academic journals and other sources of information;
- Listen to academic lectures and take notes;
- Give academic seminars and discussions;
- Deliver presentations within their area of interest and beyond

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 Module 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.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2 theory assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: CONTEMPORARY SOCIAL ISSUES	
Module Code	CSI 3580
NQF Level	5

Contact hours	Lectures: 1 x 1hr L/wk for 28 weeks (28hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1&2
Module Aims	
The module raises awareness on the need for a personal, national and global ethics.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Develop their awareness to the regional, national, and global community issues
- Transfer up to date regional and national issues to their community.

Module Content

The module raises awareness on the need for a personal, national and global ethics. The main objective of this module is to help students reflect on the social moral issues: to discover themselves in a learner-centered, contextual, religious and life related setting. It also stimulates students for critical thinking and helps them to appreciate their values, standards and attitudes.

Furthermore, it orients students with regards to the epidemiology of HIV/AIDS; the prevalence of the disease in Namibia, Africa and Internationally. It also informs students on the psycho social and environmental factors that contribute to the spread of the disease, the impact of HIV/AIDS on their individual lives, family and communities at large.

The unit further seeks to enhance HIV/AIDS preventive skills among students by means of paradigm shift and behavior change and also to impart general introductory knowledge on gender, to make students aware, as well as sensitize them towards gender issues and how they affect our society, Sub-Region and continent at large.

Assessment Strategies

Continuous Assessment: 100%

Module Title: COMPUTER LITERACY	
Module Code	CLC 3509
NQF Level	5
Contact hours	Lectures: 2 x 1hr L/wk for 14 weeks (28hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
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.	

Learning Outcomes/Specific Outcomes

Upon successful completion of this module, students should be able to:

- Define technology and its role in today's society
- Identify and describe the purposes of various computer hardware components
- Explain the role of operating systems
- Describe the purposes of databases
- Explain how databases work
- Describe how computer networks are organized and how they work
- Explain the purpose of a computer server

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 work book. 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.

Assessment Strategies

Continuous Assessment: 100%

Module Title: FUNDAMENTALS OF PHYSICAL SCIENCE	
Module Code	DAH 2401
NQF Level	4
Contact hours	Lectures: 2 x 1hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P / every 2 nd week for 14 weeks (21hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module offers an introduction to basic concepts in physics and chemistry and their role in everyday's life.	

Learning Outcomes/Specific Outcomes

Upon successful completion of this module students should be able to:

- Discuss the properties of matter
- Discuss the relationship between atoms, elements and molecules
- Differentiate between compounds, solutions and mixtures
- Perform simple separations such as filtration, distillation and decantation
- Explain the basis of the classification of elements into families on the periodic table
- Give the chemical symbols for the biologically important macro-and microelements
- Distinguish between covalent and ionic bonds
- Explain the differences between polar and non-polar molecules naming examples of each
- Discuss the properties of acids and bases and their reactions
- Relate acidity and alkalinity to pH
- Explain why water is regarded as the molecule of life
- State the laws of motion
- Define motion, force, energy, work
- State the laws of thermodynamics
- Differentiate between conduction, radiation and convection.

Module Content

Physical quantities and measurements – SI Units; properties of matter; atoms, elements, molecules & compounds, mixtures; separation methods such as filtration, distillation and decantation; the Periodic Table (electronic configuration of elements); common features of the families of elements with relevant examples; chemical symbols and formulae; covalent and ionic compounds; non-polar and polar molecules; molecular and formula mass; redox reactions; moles and molarity; chemical reactions and equations; acids and bases (definition, types, properties and reactions); pH & buffers; redox reactions; solutions and solubility; structure and properties of water; ionisation of water; laws of motion, force, energy, work; kinetic theory of gases; gas laws, pressure; thermodynamics and heat; mechanism of heat transfer, conduction, radiation and convection.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5 x practical assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: PRINCIPLES OF BIOLOGY	
Module Code	DAH 2411
NQF Level	4
Contact hours	Lectures: 4 x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr P / week for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module is designed to introduce students to biology at an entry level by examining the hierarchy that ranges from the fundamentals of cell biology to the interactions among those organisms in their environment. The topics in this module include cell biology, basic genetics, chemical basis of life, the six kingdoms of living organisms, metabolism, introduction to ecology.	

Learning outcomes/Specific outcomes

Upon completion of this course, the student should be able to:

- List the three domains and six kingdoms of living organisms and classify organisms in one of these taxa
- Distinguish between the main groups in the kingdom Plantae and kingdom Animalia
- Distinguish between prokaryotic and eucaryotic cells
- Differentiate between plant and animal cells
- List the macromolecules and their functions important to cell biology
- Describe diffusion, osmosis and active transport
- Outline the breakdown of carbohydrates, fats and proteins
- Describe the cell cycle
- Differentiate between mitosis and meiosis
- Differentiate between sexual and asexual reproduction
- Discuss the basic laws of heredity
- Discuss Mendel's laws of inheritance
- Interpret a monohybrid and dihybrid cross
- Define basic ecological concepts such as communities, ecosystems etc.
- Describe the food chain and food web
- Discuss interrelationship among organisms

Module Content

Chemical basis of life; structure of macromolecules and their functions; prokaryotic and eukaryotic cells; overview of the three domains and six kingdoms of organisms; 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.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: APPLIED MATHEMATICS AND BASIC STATISTICS	
Module Code	DAH 2431
NQF Level	4
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Tutorials: 1 x 2hr T / week for 14 weeks (28hrs)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module will focus on calculations involving fractions, decimals, ratios and proportions, unit conversions, and algebraic equations. Furthermore, this module will introduce students to the subject of statistics as an applied approach to data description and statistical inference.	

Learning Outcomes/Specific Outcomes

Upon successful completion of this module, the student should be able to:

- Perform basic calculations involving ratios, proportions, and ratio fractions
- Perform conversions between decimals, fractions, ratios, and percentages
- Perform conversions between metric and apothecary systems of measure
- Distinguish between qualitative and quantitative variables
- Distinguish between primary and secondary data, categorical and quantitative data, discrete and continuous data
- Distinguish between mean, median and mode
- Draw and interpret bar graphs, pie-charts, stem and leaf plots and box plots

Module Contents:

Mathematics: decimals and fractions, simple algebraic equations, ratios and proportions, conversions between decimals, fractions, ratios, and percentages using appropriate animal health related examples.

Basic Statistics: variables, types of data, sources of data, rationale of sampling, sampling techniques, scales of measurement, measures of location: mean, median, mode, quartiles, percentiles, measures of absolute dispersion: range, mean, absolute deviation, standard deviation, graphical descriptive statistics: bar graphs, pie-charts, histograms, frequency polygons, stem and leaf plots and box plots.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2 x theory assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: VETERINARY PARAPROFESSIONAL SKILLS	
Module Code	DAH 2402
NQF Level	5
Contact hours	Lectures: 2x 1hr L/week for 14 weeks (28hrs)
NQF Credits	8
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module aims to develop soft skills for veterinary paraprofessionals in order to improve their effectiveness in the workplace. In addition, entrepreneurial and accounting skills will be covered.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Communicate effectively with clients
- Manage self and client stress effectively
- Take a patient history
- Write a report on activities undertaken
- Recognise and respond appropriately to the human-animal bond between clients and patients
- Apply animal welfare principles to manage conflict of interest situations with clients
- Explain how to prevent negative impact of various paraprofessional activities on the environment
- Draw up a basic budget
- Develop a basic accounting system for an animal health practice/enterprise and manage it

Module Content

Introduction to communication skills and self-care, effective communication with clients to gain their confidence and cooperation, management of self and client stress; clinical interview and reporting skills (medical communication, patient history taking, client communication), human-animal bond; conflict of interest as it relates to animal welfare; awareness of environmental impacts related to all paraprofessional activities such as responsible use of chemical and disposal of hazardous wastes; basic business entrepreneurial skills, basic accounting and budgeting skills.

Assessment Strategies

Continuous Assessment: 100% (Minimum 3 assessments)

Module Title: ANIMAL ANATOMY I	
Module Code	DAH 2412
NQF Level	4
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P/ week for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module aims to provide students with a basic understanding of structural organization of the animal body. It provides an overview of the gross, microscopic and basic developmental aspects of the anatomy of common livestock and companion animals. The module will focus on the following systems: musculoskeletal, digestive, cardiovascular, excretory and respiratory.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Distinguish between gross anatomy, histology and embryology
- Use appropriate terminology to describe the anatomy of the important organ systems
- Name and locate the major bones, joints and muscles of common livestock and companion animals
- Describe the differences in dentition between common livestock and companion animals
- Describe the course of the oesophagus in the neck of common livestock
- Identify, locate and describe the stomach of common livestock
- Identify and describe the intestines in common livestock
- Locate and describe the functional structure of the heart
- Locate the various points for taking pulse and venipuncture in common livestock and companion animals
- Locate the common lymph nodes used in clinical examination of common livestock and companion animals
- Locate and describe the structure of the kidney in common livestock and companion animals
- Describe the structure of the skin and its accessory structures
- Identify and locate different paranasal sinuses
- Describe the basic structure of the larynx
- Identify and locate the trachea and lungs of common livestock

Module Content

Anatomical terminology, regions and planes of the animal body; Musculoskeletal (osteology, arthrology, myology), digestive (gross and topographical anatomy of the mouth, oesophagus, stomach, intestines, anatomical differences between ruminants and non-ruminants), cardiovascular (gross and topographical anatomy of the heart, blood vessels and lymphatics), excretory (gross and topographical anatomy of the kidney, skin and accessory structures), and respiratory (gross and topographical anatomy of the lower and upper respiratory organs).

The practical component of this module will reflect an integrated approach between form (Anatomy) and function (Physiology).

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7 x practical assessments)
2. Examination: 40% (1 x 3 hour paper: 50% and 1x 2hr practical exam: 50%)

Module Title: ANIMAL PHYSIOLOGY I	
Module Code	DAH 2432
NQF Level	4
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs);
NQF Credits	16
Co-requisites	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module aims to provide students with a basic understanding of the functioning of specified systems of the animal body. The physiology of the musculoskeletal, digestive, cardiovascular, excretory, and respiratory systems will be covered.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Explain the concept of homeostasis, regulatory mechanisms and compensatory responses
- Discuss the functions of skeletal and smooth muscles
- Describe the process of muscle contraction
- Explain the effect of prolonged use of muscle on its contraction potential
- Discuss the digestion and absorption of carbohydrates, protein and fats in ruminants and non-ruminants
- Explain the physiological differences between digestion in ruminants and non-ruminants
- Explain the functions of the cardiovascular system
- Explain the functions of the different components of blood
- Measure blood parameters such as blood pressure, PCV, pulse
- Explain the effect of altitude on the cardiovascular system

- Discuss the role of kidney as an excretory organ
- Explain the role of kidney in blood pressure, electrolyte/water balance, acid-base balance
- Discuss intrinsic and extrinsic factors affecting urine production
- Explain the role of the skin in excretion and thermoregulation
- Discuss hyper- and hypo-ventilation
- Define the concepts of residual lung volume, tidal volume, vital capacity, maximum exchanged volume
- Discuss the factors affecting respiration

Module Content

Organ system integration, structure-function relationship, homeostasis, physiology of the musculoskeletal (muscle types, muscle contraction, muscle fatigue, myopathies), digestive (types of digestive systems, digestion and absorption of carbohydrates, proteins and fats; differences in digestion between ruminants and non-ruminants), cardiovascular (composition and functions of blood and lymphatic system, measuring of blood parameters such as blood pressure, hematocrit, PCV, heart rate, functioning of the circulatory system, effect of altitude on cardiovascular physiology), excretory (renal physiology: urine formation, factors affecting urine production, micturition, urinalysis; skin physiology: sweat, sebum, thermoregulation), and respiratory systems (ventilation, gaseous exchange, lung volumes, measuring respiration rate, factors affecting respiration such as altitude, exercise, pregnancy, etc.).

While there are no formal practicals attached directly to this module, the relevant practical aspects of the content will be covered under Anatomy I (DAH 2412) in an integrated way.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7 x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: BASIC ANIMAL BEHAVIOR, HANDLING AND WELFARE	
Module Code	DAH 2452
NQF Level	4
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P / every 2 nd week for 14 weeks (21hrs)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module aims to give students an understanding of farm animal behaviour and welfare with emphasis on their habits, responses to stressors related to restraining and handling, husbandry, housing, transport and slaughter. The current and applicable international animal welfare standards and legislation on animal welfare in Namibia will be discussed.	

Learning Outcomes/Specific Outcomes

Upon successful completion of this module, the student should be able to:

- Differentiate and describe the major types of animal behaviour
- Confidently handle animals in different physiological states
- Confidently approach and restrain livestock and companion animals for clinical examinations, operative procedures and transport
- Describe the flight zone and point of balance for low stress handling of cattle, sheep, and pigs
- List the physiological and behavioural factors that assist in assessing the welfare of animals
- Compile and interpret an ethogram
- List and explain the five freedoms of animal welfare
- Discuss welfare and ethical concerns in animal production, training and transport in relation to OIE recommendations
- Discuss disaster management of animals in emergency situations, such as in drought and floods
- Describe the role of veterinary paraprofessionals and animal welfare organisations in setting and keeping animal welfare standards

Module Content

Normal behavior of livestock and companion animals; major types of behavior (pre-consumatory, consumatory and post-consumatory) in livestock and companion animals; correct handling and restraining methods of healthy and

unhealthy animals (psychological, physical and chemical) as well as the impact of these methods on animal behaviour and welfare.

Aspects of animal welfare with specific reference to the Five Freedoms and OIE animal welfare recommendations; disaster management of animals in emergency situations as well as physiological, behavioural, disease and production parameters of animal welfare; animal husbandry issues such as housing, handling, transport and slaughter of animals with relevance to their impact on the welfare of animals; relevant animal protection and welfare legislations, including the university's animal welfare policies, and the role of welfare organisations.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5 x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

SECOND YEAR MODULES

Module Title: BASIC VETERINARY PARASITOLOGY	
Module Code	DAH 2501
NQF Level	5
Contact hours	Lectures: 2 x 1hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P / every 2 nd week for 14 weeks (21hrs)
NQF Credits	8
Prerequisites	DAH 2411
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module aims to give students a basic understanding of parasitology (both internal and external parasites) as well as common parasitic diseases of veterinary importance in farm and companion animals.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Recognise signs of parasitic infestation in livestock and companion animals
- Recognise common internal and external parasites of livestock and companion animals
- Collect appropriate parasitological specimens
- Package and label parasitological specimens for transport
- Prepare parasitological samples for laboratory analysis
- Explain how to prevent common internal and external parasitic diseases in livestock and companion animals
- Prepare and apply control programs for animal parasites
- Explain the principles of resistance to antiparasitic remedies

Module Content

Common internal and external parasites of livestock and companion animals in Namibia, including zoonotic diseases (sampling, processing and analysing parasitological specimens); common parasitic diseases (clinical symptoms, prevention, appropriate use of antiparasitic drugs and parasite control programs) of livestock and companion animals.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5x practical assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: ANIMAL ANATOMY II	
Module Code	DAH 2511
NQF Level	5
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P/ week for 14 weeks (42hrs)
NQF Credits	16
Pre-requisite	DAH 2412
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module aims to provide students with a basic understanding of structural organization of the animal body. It provides an overview of the gross, microscopic and basic developmental aspects of the anatomy of common livestock and companion animals. The module will focus on the following systems;	

reproductive, endocrine, nervous and reticulo-endothelial. In addition, basic avian, reptilian and fish anatomy will be discussed.

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Use appropriate terminology in describing the anatomy of organ systems
- Name and locate the male and female internal and external reproductive organs of livestock
- Name and locate the major endocrine glands in livestock
- Describe the general anatomical organisation of the central and peripheral nervous systems
- Explain how the autonomic nervous system differs from the rest of the nervous system
- Locate the sciatic nerve and explain how to avoid it during intramuscular injection of the hamstring muscles
- Describe the structure of the eye and its adnexa
- Identify the tongues of different livestock species
- Name and locate the major lymphnodes important in clinical examination and meat inspection of livestock
- Describe the adaptations for flight
- Refer to the anatomy of the chicken to explain why intramuscular injections should not be given in the leg
- Explain how avians are adapted for egg laying and brooding
- Explain why it is important to extend the leg to remove the birds from the perch
- Locate venipuncture points in birds
- Explain the anatomical adaptations of the crocodiles for hunting and feeding in water
- Refer to the anatomy of the jaws of the crocodile to explain why the mouth could be restrained with relatively weak material
- Discuss the adaptive anatomy of the tail muscles of the crocodile
- Explain the importance of the fat body in the reproduction of the crocodile
- Describe the respiratory adaptation of fish

Module Content

Reproductive system (gross and topographical anatomy of male and female internal and external reproductive organs of livestock), endocrine system (topographical anatomy of the major endocrine glands), nervous system (gross and topographical anatomy of the major structures of the central and peripheral nervous systems of common livestock, anatomy of the eye, external ear, and the tongue), reticulo-endothelial system (location of major lymphatics and the spleen); anatomical adaptations of birds, reptiles and fish.

The practical component of this module will reflect an integrated approach between form (Anatomy) and function (Physiology).

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7 x practical assessments)
2. Examination: 40% (1 x 3 hour paper) and 1x 2hr practical exam: 50%)

Module Title: ANIMAL PHYSIOLOGY II	
Module Code	DAH 2531
NQF Level	5
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56 hrs);
NQF Credits	16
Pre-requisites	DAH 2432
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module aims to provide students with a basic understanding of the functioning of specified systems of the animal body. This module will cover the physiology of the reproductive, endocrine, nervous, and immune systems. In addition basic avian, reptilian and fish physiology will be discussed.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Compare and contrast gametogenesis in male and female animals
- Describe the role of accessory sex glands in reproduction
- Explain the role of hormones and the processes involved in fertilisation
- Explain role of hormones in recognition and maintenance of pregnancy
- Explain the role of hormones and events involved in parturition

- Compare and contrast the roles of the endocrine and nervous systems
- Discuss the hypothalamo-pituitary axis
- Explain the role of important hormones such as insulin, glucagon, thyroid hormones etc.
- Describe the functional organization of the nervous system, including the central and peripheral nervous systems, and the autonomic nervous system
- Describe how a nervous impulse is initiated and transmitted
- Distinguish between positive and negative feedback loops
- Describe the reflex arc
- Discuss the functions of the sensory organs
- Distinguish between innate and adaptive immune responses
- Discuss the importance of colostrum for neonates
- Explain the physiological basis of vaccination
- Perform serological reactions such as the agglutination test, tuberculin skin test and precipitation test
- Explain specific physiological adaptations of avian, reptilian and fish species

Module Content

Functions of the reproductive system (spermatogenesis, oogenesis, puberty, estrus cycle, role accessory sex glands, fertilisation, pregnancy and parturition physiology, reproductive endocrinology); endocrine system (cooperation between nervous and endocrine system, endocrine glands, hormones and their functions); nervous system and sensory physiology (nerve impulse, action potential, reflexes, neurotransmission, feedback mechanism, function of the sense organs); immune system (innate and adaptive immunity, active and passive immunity, the role of colostrum in neonates, physiology of vaccination and animal response, recognition of self and non-self, serological reactions); avian, reptilian and fish physiology and their adaptation to their respective environments will also be covered.

While there are no formal practicals attached directly to this module, the relevant practical aspects of the content will be covered under Anatomy I (DAH 2511) in an integrated way.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7 x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: INFECTIOUS DISEASES I	
Module Code	DAH 2551
NQF Level	5
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P/week for 14 weeks (42hrs)
NQF Credits	16
Pre-requisites	DAH 2411
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module aims to give students an introduction to microbiology and an overview of common bacterial and mycoplasmal diseases of veterinary importance in domestic and wild animals as well as principles of prevention and control.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Distinguish between the main groups of microorganisms such as bacteria, mycoplasma, viruses, fungi and prions
- List and discuss the common foodborne pathogens
- Discuss the characteristics and structure of bacteria, mycoplasma, viruses, fungi and prions
- Classify bacteria, mycoplasma, viruses, fungi and prions
- Discuss the multiplication/replication strategies of bacteria, mycoplasma, viruses, fungi and prions
- Perform basic laboratory techniques used in microbiology such as culture, staining and isolation
- Describe pathogenic traits of bacterial and mycoplasmal diseases of veterinary importance to Namibia
- Describe principles of managing animals infected by bacterial diseases of veterinary importance to Namibia as well as methods to control disease transmission
- Implement relevant control programs for animals infected by bacterial diseases of veterinary importance in Namibia
- Discuss vaccination programs for selected common bacterial diseases in Namibia

- List and report notifiable bacterial diseases of veterinary importance in Namibia

Module Content

Introduction to microbiology, including common food-borne pathogens; selected bacterial and mycoplasmal diseases of veterinary importance to the Namibian animal industry (including zoonotic diseases), recognition of clinical signs and management of infected animals, as well as preventing the transmission of the disease; relevant control programs such as movement control, quarantine and vaccination of common bacterial diseases;

Laboratory content will focus on biosafety and biosecurity, appropriate sample handling, staining of bacteria, culturing, isolation of bacterial pathogens.

Assessment Strategies

- Continuous Assessment: 60% (Minimum 2x theory assessments and 7 x practical assessments)
- Examination: 40% (1 x 3 hour paper)

Module Title: BASIC PHARMACOLOGY AND TOXICOLOGY	
Module Code	DAH 2571
NQF Level	5
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P/every 2 nd week for 14 weeks (21hrs)
NQF Credits	16
Pre-requisite	DAH 2432
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module is designed to give the student a basic knowledge on the different classes, types and use of veterinary medicines and teach the importance of dosage calculations, routes of administration, and the danger and recognition of adverse reactions. The module will also provide an overview of toxicology.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Classify different pharmacological products
- Calculate appropriate dosage of pharmacological products
- Describe appropriate routes of administration of common pharmacological products
- Discuss the basic principles of pharmacodynamics
- Explain the importance of enforcing recommended withdrawal periods
- Discuss the handling and storage of pharmaceutical products with special reference to the cold chain
- Use schedule 0 pharmacological products responsibly and appropriately according to the Namibian scheduling classification
- Describe the legislation governing the use of schedule 1-5 pharmacological products according to the Medicines and Related Substances Control Act, Act 13 of 2003
- Discuss the concept of anti-microbial drug resistance
- Identify the major toxic plants and discuss their importance in the livestock sector of Namibia
- Recognise signs of common plant toxicoses and apply appropriate control measures
- Recognise signs of common heavy metals and chemical toxicoses and apply appropriate control measures
- Recognise signs of salt/water toxicity
- Identify the major venomous animals and discuss their importance in the livestock sector of Namibia

Module Content

Pharmacology: Classification of pharmaceutical products; dosage calculation, routes of administration, absorption, distribution and excretion in the animal body, withdrawal periods; handling and storage; different classes of pharmaceutical products will include: antibiotics, anaesthetics, hormones, antihistamines, vitamins, vaccines, antisera, parasiticides, disinfectants, antiseptics, and antidotes, etc.; legislation regulating the use of medicines in Namibia.

Toxicology: Effect and management of toxicoses including those caused by toxic plants and chemicals and heavy metals including arsenic, strichnine, organophosphates, carbamates, cyanide, lead, mercury, pesticides, herbicides, urea, salt/water intoxication, mycotoxins and venomous animals.

Assessment Strategies

- Continuous Assessment: 60% (Minimum 2x theory assessments and 5x practical assessments)
- Examination: 40% (1 x 3 hour paper)

Module Title: INFECTIOUS DISEASES II	
Module Code	DAH 2502
NQF Level	5
Contact hours	Lectures: 1x 2hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P / every 2 nd week for 14 weeks (21hrs)
NQF Credits	8
Co-requisite	DAH 2551
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module aims to give students an overview of common viral, prion and fungal diseases of veterinary importance in domestic and wild animals as well as principles of prevention and control.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Describe pathogenic traits of viral, prion and fungal diseases of veterinary importance to Namibia
- Describe principles of managing animals infected by viral, prion and fungal diseases of veterinary importance to Namibia as well as methods to control disease transmission
- Implement relevant control programs for animals infected by viral, prion and fungal diseases of veterinary importance in Namibia
- Discuss vaccination programs for selected common viral diseases in Namibia
- List and report notifiable viral and prion diseases of veterinary importance in Namibia

Module Content

Selected viral, prion and fungal diseases of veterinary importance to the Namibian animal industry (including zoonotic diseases), recognition of clinical signs and management of infected animals, as well as preventing the transmission of the disease; relevant control programs such as movement control, quarantine and vaccination of common viral, prion and fungal diseases.

Laboratory content will focus on biosafety and biosecurity, appropriate sample handling.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5 x practical assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: RESEARCH METHODS	
Module Code	DAH 2522
NQF Level	5
Contact hours	Lectures: 1 x 2hr L/week for 14 weeks (28hrs)
NQF Credits	8
Pre-requisite	DAH 2431
Semester Offered	2
Module Aims	
This module introduces students to the research process to enable them to undertake a special project.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Describe the scientific method
- Distinguish between a null and alternative hypothesis
- Explain the importance of experimental design to achieve measurable outcomes
- Interpret and discuss findings
- Present findings using power point to a specific audience

Module Content

The scientific method, formulation of a topic, problem statement, objectives, research questions/ hypotheses; literature review, experimental design, data collection and analysis, interpretation and discussion of findings, power point presentation.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2 x theory assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: ANIMAL PATHOLOGY	
Module Code	DAH 2512
NQF Level	5
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P / week for 14 weeks (42hrs)
NQF Credits	16
Prerequisites	DAH 2412 and DAH 2432
Co-requisites	DAH 2511 and DAH 2531
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module aims to provide students with knowledge of mechanisms of disease and the macroscopic appearance of diseased organs in comparison to healthy organs. The modules exposes students to appropriate tissue sampling.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Describe common *post mortem* changes
- Examine and describe gross lesions using appropriate terminology
- Describe personal protective and safety measures when performing necropsy with reference to zoonotic diseases such as anthrax
- Correctly perform a necropsy and collect appropriate samples from vertebrate animals
- Make a blood smear
- Correctly prepare, package, label, store and transport biological samples with required documentation
- Recognize and distinguish between healthy and affected organs
- Distinguish between infectious and non-infectious lesions

Module Content

Introduction to pathology, common *post mortem* changes such as *rigor mortis*, putrefaction etc., cellular pathology, including lesions due to various disease processes, circulatory disturbances, inflammation and neoplasia; basic pathology of the major systems (cutaneous, muscular, respiratory, endocrine, skeletal, nervous, reproductive, cardiovascular, gastrointestinal, lymphatic); necropsy procedure, appropriate sampling methods (collection, packaging, labelling, storage, transport and basic processing).

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7 x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: ANIMAL PRODUCTION AND REPRODUCTION	
Module Code	DAH 2532
NQF Level	5
Contact hours	Lectures: 4 x 1 hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P / week for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
The module aims to introduce students to reproduction of relevant livestock species in Namibia. Production, management and marketing of animals and animal products will also be covered.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Compare reproductive cycles and mating behaviour in various livestock species
- Explain the importance of assisted animal reproduction in livestock
- Perform artificial insemination using both fresh and frozen semen in cattle
- Describe the basic signs and management of relevant disorders of the male and female reproductive systems
- Explain the management of dystocia in farm animals
- Discuss the management of female post-partum problems (e.g. vaginal/uterine prolapse, retained placenta)
- Recognise when veterinary intervention is required when dealing with reproductive requirements

- Discuss the management of pregnant animals and neonates of various species
- Distinguish between natural and artificial selection
- Apply genetic principles of selection to animal breeding
- List important animal production systems in Namibia
- Apply relevant management practices to intensive and extensive production systems
- Discuss the economic importance and contribution of the livestock sector to the Namibian economy
- Apply tools such as partial budgeting and cost-benefit analysis to animal health and production
- Explain appropriate marketing practices used for animals and animal products

Module Content

The reproductive cycle of livestock species, and mating behaviour; principles of the application of assisted reproductive technologies with emphasis on oestrus synchronization and artificial insemination; basic reproductive disorders of both male and female domestic animals with emphasis on the causes, recognizing clinical symptoms and management thereof; basic approach to the management of dystocia cases in livestock and post-partum problems; correct approach to the management of pregnant and newborn animals; genetic principles used in breeding and selection of farm animals as well as its practical application.

Fundamental principles of animal farming including benefits of animal products and scope of the animal industry and production systems in Namibia; planning and application of relevant intensive and extensive management programs; economic considerations using basic methods such as partial budgeting and cost-benefit analysis, marketing practices and consumer affairs.

Assessment Strategies:

1. Continuous Assessment: 60% (Minimum 2 x theory assessments and 7 x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: ANIMAL NUTRITION	
Module Code	DAH 2552
NQF Level	5
Contact hours	Lectures: 4 x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr P/ week for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aims	
This module provides an introduction to animal nutrition in ruminant and non-ruminant species, with emphasis on feedstuff composition and ration formulation. Rangeland management is an important component of this module.	

Learning outcomes/Specific outcomes

Upon completion of this course, the student should be able to:

- Name the different categories of animal feeds
- Discuss the nutritional values of different animal feeds
- Discuss the nutritional requirements of different species of domestic animals.
- Discuss the selection of ingredients and their formulation into feeds that meet requirements for growth, production and reproduction in animals.
- Recognize and correct nutritional disorders in farm animals
- Describe the different veld types of Namibia
- Identify the common forage species (grasses, shrubs and trees)
- Calculate the carrying capacity of a veld/pasture
- Explain the importance of rotation and resting and rehabilitation in rangeland management
- Discuss management options for controlling invasive plants and the associated long-term environmental impact
- Discuss the role of cultivated forage in animal nutrition
- Discuss the preparation and storage of feedstuff

Module Content

Introduction to animal nutrition, classification and nutritional values of feeds, chemical composition of feeds, feed analysis, nutritional requirements of farm animals, feeding of various groups of animals (rations formulation) in different physiological states, nutritional disorders including acidosis, ketosis, bloat, milk fever, etc.

Veld types of Namibia and their characteristics, common forage species, feeding habits and selective feeding; principles of rangeland management including carrying capacity, resting of veld, rotation, rehabilitation and invasive plants; cultivated forage, preparation and storage of feedstuff such as hay and silage will also be discussed.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: FIELD ATTACHMENT (ANIMAL PRODUCTION)	
Module Code	DAH 2509
NQF Level	5
Contact hours	Fieldwork attachment for 2 weeks
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Module Aim: This field attachment provides practical experience on a production animal farm.	

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- Demonstrate the attainment of practice-oriented experiences beyond the classroom in executing livestock and poultry management activities

Module Contents:

All diploma students will undertake two (2) weeks of field attachment on a farm approved by the university to gain practical exposure to animal production systems (housing, feeding and management practices) and hands-on skills such as animal handling and restraint. Students will be expected to complete a prescribed list of tasks verified by the farm manager.

Assessment Strategies

Continuous assessment 100%:

- report presentation at a seminar (40%)
- field report (60%)

Assessment is subject to satisfactory attendance and good conduct during attachment, submission of a signed, verified and approved logbook detailing the activities completed.

THIRD YEAR MODULES

Module Title:	SPECIAL PROJECT
Module Code:	DAH 2600
NQF Level:	6
Contact hours:	98 integrated over 28 weeks
NQF Credits:	16
Pre-requisites:	DAH 2522
Compulsory/Elective:	Compulsory
Semester Offered:	1 & 2

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Identify a topic
- Write a project proposal including the literature review
- Plan and execute the project
- Present project findings orally and in writing

Module Contents:

Students carry out a supervised study of a current topic related to the chosen option (Animal Health or Laboratory Technology). Each student will work under the supervision of a faculty advisor to plan and execute a study. Students will present their results orally and submit a written report.

Assessment Strategies

Continuous assessment 100%:

- Project proposal (10%)
- Oral presentation (30%)
- Final written report (60%)

Module Title: LEGISLATION AND JURISPRUDENCE	
Module Code	DAH 2601
NQF Level	6
Contact hours	Lectures: 2x 1hr L/week for 14 weeks (28hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module aims to provide the students with information and knowledge about the relevant Namibian legislation pertaining to the activities of veterinary paraprofessionals.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- List relevant legislations pertaining to veterinary paraprofessional activities
- Discuss relevant aspects of legislation pertaining to veterinary paraprofessional activities
- Discuss principles pertaining to certification of animals and animal products
- Discuss principles of identification and traceability of animals and animal products in Namibia including wildlife
- Adhere to the UNAM code of conduct of veterinary paraprofessionals
- Describe procedures to be followed when enforcing relevant veterinary legislation

Module Content

Relevant aspects of Namibian legislation pertaining to the activities of veterinary paraprofessionals: Animal Health Act, Act 1 of 2011; Animal Protection Act, Act 12 of 1962; Veterinary and Veterinary Paraprofessionals Act, Act 1 of 2013; Prevention of Undesirable Residues in Meat Act, Act 21 of 1991; Medicines and Related Substances Control Act, Act 13 of 2003; Stock Brands Act, Act 24 of 1995; Nature Conservation Ordinance 1975 and associated Rules and Regulations; UNAM code of conduct for veterinary paraprofessionals

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 3 assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: INTRODUCTION TO VETERINARY EPIDEMIOLOGY	
Module Code	DAH 2621
NQF Level	6
Contact hours	Lectures: 1 x 2hr L/week for 14 weeks (28 hrs); Tutorials: 1 x 2hr T / every 2 nd week for 14 weeks (14hrs)
NQF Credits	8
Prerequisite	DAH 2431
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module is aimed at providing theoretical and practical information on epidemiological methods used in veterinary sciences. Students will be acquainted with basic epidemiological concepts, basic knowledge about the evolution of a disease in a population, diagnostic tests, disease surveys, observational studies, evidence based medicine, clinical trials and basics of disease control, investigation and early warning systems.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Explain the principles and concepts of epidemiology
- Describe disease outbreaks and events in populations
- Administer epidemiological questionnaires and surveys
- Explain the importance of appropriate sampling methods and sample size
- Discuss various risk factors in disease outbreak and transmission
- Discuss relevant contingency measures for selected animal diseases in Namibia
- Discuss the execution of disease control schemes and response plans
- Describe the principles of disease surveillance

Module Content

Basic epidemiological concepts, fields of epidemiology, population and its characteristics, emerging and course of a disease in populations; questionnaire administration, basics of disease survey, sampling and sample size; evaluation of disease risk factors and mode of disease transmission; methods of disease control schemes, disease outbreak contingency and response plans, basics of disease control and investigation; monitoring, surveillance and early warning systems

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 3 assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: HERD AND FLOCK HEALTH MANAGEMENT	
Module Code	DAH 2641
NQF Level	6
Contact hours	Lectures: 2x 1hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P / every second week for 14 weeks (21hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Module Aims	
This module aims to expose students to the overview of herd and flock management, planning of production and health management strategies and the application of biosecurity in cattle, sheep, goats, pigs and poultry for optimum health and production.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Discuss the management and disease prevention strategies to ensure optimal health and production in herds and flocks in different situations (e.g. farm, feedlot, quarantine station)
- Design and implement appropriate vaccination programs for herds and flocks
- Implement relevant biosecurity protocols and culling management to herds and flocks
- Design appropriate and relevant herd and flock record systems
- Maintain appropriate and relevant herd and flock records
- Discuss aspects of replacement rearing, milk production and udder health in dairy cattle
- Explain and apply the all-in all-out principle

Module Content

Overview of herd and flock management in cattle, sheep, goats, pigs and poultry, health management strategies including vaccination programs, biosecurity protocols, culling management, and effective record keeping; emphasis will be placed on monitoring and management of replacement rearing, dry period, milk production, herd fertility, udder health in dairy cattle and principle of all-in all-out protocols.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: INTRODUCTION TO VETERINARY PUBLIC HEALTH	
Module Code	VPH 2661
NQF Level	6
Contact hours	Lectures: 2 x 1hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P every 2nd week for 14 weeks (21hrs)
NQF Credits	8
Pre-requisite	DAH 2512
Compulsory/Elective	Elective
Semester Offered	1
Module Aims	
This module provides students with knowledge of veterinary public health with specific emphasis on zoonoses and meat hygiene.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Explain the one health concept
- List and describe diseases of public health importance in the meat industry
- Discuss important considerations for the layout of red and white meat establishments
- Describe the standard operating procedures in a meat establishment
- Discuss animal welfare requirements at the time of slaughter
- Describe slaughter, dressing and storage processes for bovine, porcine, sheep, poultry and game
- Perform a primary meat inspection for bovine, porcine, sheep, poultry and game carcasses and offal
- Identify common pathological conditions during meat inspection and take appropriate action on the affected meat
- Explain temperature requirements for chilling and freezing of meat
- Describe the options that are available for the disposal various waste streams from a meat establishment
- List the seven principles of HACCP
- Keep effective and appropriate records

Module Content

Introduction to the one health concept, overview of diseases that are an occupational/public health risk in the meat industry (including brucellosis, bovine tuberculosis, Crimean Congo Haemorrhagic Fever), zoonoses and public health; meat establishment siting and layout (All species- bovine, porcine, sheep, poultry and game abattoir); an overview of animal welfare requirements at the time of slaughter; ante-mortem inspection; slaughter, dressing and storage processes (bovine, porcine, sheep, poultry and game); primary meat inspection (post-mortem) procedures for bovine, porcine, sheep, poultry and game carcasses and offals); common and important pathological conditions observed during meat inspection in cattle, sheep, pig, poultry and game meat; temperature requirements for chilling and freezing of meat; carcass detaining procedures; storage, handling and disposal of condemned meat and waste (effluent, blood and solid waste); the 7 principles of Hazard Analysis Critical Control Point (HACCP) systems; record keeping

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7x practical assessments)
2. Examination: 40% (1 x 3 hour paper: 50% and 1x 2hr practical exam: 50%)

Module Title: VETERINARY FIRST AID	
Module Code	VAT 2601
NQF Level	6
Contact hours	Lectures: 2 x 1hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P/every 2 nd week for 14 weeks (21hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	1
Module Aims	
This module aims to expose students to emergency first aid treatment and patient management and common veterinary obstetrical problems including post-partum disorders of farm animals.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- List the basic equipment and content of a first aid kit needed for emergency management of farm animals

- Describe the basic aseptic preparations for surgical interventions
- Monitor an animal under anaesthesia
- Describe pre-operative and post-operative care of patients
- Resuscitate neonates and adult animals using non-surgical procedures
- Splint and stabilise broken bones/ horns and dislocated joints as appropriate
- Provide emergency care for allergic reactions, poisoning, burns, bleeding and bloat
- Discuss the management of different types of wounds
- Explain how to manage a downer cow
- Recognise when veterinary intervention is required

Module Content

Basic equipment and first aid kit needed for emergency management of farm animals; aseptic preparations for surgical procedure; basic principles of anaesthesia; principles of routine management procedures such as castration and dehorning; resuscitation, splinting and stabilisation of broken bones/horns and dislocated joints; management of allergic reactions, poisoning, burns, bleeding and bloat; post operative care and wound management; management of a downer cow.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5x practical assessments)
2. Examination: 40% (1 x 2 hour paper: 50% and 1x 2hr practical exam: 50%)

Module Title: ANIMAL HEALTH EXTENSION	
Module Code	VAT 2611
NQF Level	6
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P / week for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	DAH 2532 and DAH 2552
Compulsory/Elective	Elective
Semester Offered	1
Module Aims	
This module aims to expose the student to animal health extension services to farmers and stakeholders in Namibia, using a holistic approach.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Discuss the techniques used for effective dissemination of information in the livestock sector
- Discuss the application of participatory rural appraisal (PRA) in communities with respect to animal health
- Perform farm inspection and community visits
- Discuss and apply standards involved in animal gatherings
- Perform surveillance and monitoring activities at farm/community level
- Advise farmers on issues related to animal health and production
- Implement and enforce vaccination programs as appropriate
- Enforce animal identification and movement control regulations
- Collect and collate data to be used in livestock census

Module Content

Overview of the effective paraveterinary service delivery for the improved productivity of farm animals, including information dissemination techniques; principles and use of participatory rural appraisal (PRA), as well as standard operational procedures involved in farm inspection, community visits and animal gatherings; the role of the animal health technician in supporting state veterinarians with respect to the improvement, control and monitoring of the health status of the national herd; animal disease control, surveillance and monitoring activities; the execution/control of vaccination programs, the control of stock movements; stock inspections, livestock census, etc.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 7x practical assessments)
2. Examination: 40% (1 x 3 hour paper)

Module Title: LABORATORY BIOSAFETY AND BIOSECURITY	
Module Code	VVT 2601
NQF Level	6
Contact hours	Lectures: 2x 1hr L/week for 14 weeks (28hrs); Practicals: 1 x 3hr P / every 2 nd week for 14 weeks (21hrs)
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Elective
Semester Offered	1
Module Aims	
This module provides an overview of biosecurity and biosafety practices, equipment, and facilities for the safe and secure handling of dangerous pathogens and other biohazards in a laboratory setting.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Explain the importance of laboratory design with regard to biosafety and biosecurity of a diagnostic laboratory
- Discuss the risks involved in the handling of common equipment used in veterinary diagnostic, practice and research/teaching laboratories
- Describe the flow and appropriate handling of samples from reception to result in the different sections of the laboratory
- Recommend appropriate protective clothing and equipment for various activities in veterinary diagnostic, practice and research/teaching laboratories
- Apply appropriate sterilization and disinfection techniques in a laboratory setting
- Implement biosafety and biosecurity protocols to protect personnel and the environment
- Discuss hazards and risks associated with the handling of pathological and other biohazardous materials
- Describe the different containment levels in a laboratory setting
- Safely handle, store and dispose of pathological and other hazardous materials
- Enforce and apply appropriate biosecurity guidelines
- Explain how to avoid cross contamination in the lab
- Discuss quality control aspects of a diagnostic laboratory

Module Content

Laboratory design and work practices; flow of samples from reception to result including handling and control; safe handling of laboratory equipment and materials, personal protective equipment and clothing; sterilization and disinfection in the laboratory; laboratory biosafety protocols; hazards and risks associated with the handling of pathological and other biohazardous materials, containment levels; handling and storage of biological/pathological materials; disposal of waste, expired chemicals and other hazardous materials; principles of laboratory biosecurity, biosecurity guidelines, good microbiology practices; quality control aspects of a diagnostic laboratory.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5x practical assessments)
2. Examination: 40% (1 x 2 hour paper)

Module Title: LABORATORY TECHNIQUES	
Module Code	VVT 2611
NQF Level	6
Contact hours	Lectures: 4 x 1hr L/week for 14 weeks (56hrs); Practicals: 1 x 3hr P/ week for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	DAH 2431
Compulsory/Elective	Elective
Semester Offered	1
Module Aims	
This module covers laboratory instrumentation, reagent preparation and quality control. It further introduces students to diagnostic procedures in areas of clinical pathology, histopathology, microbiology, immunology, parasitology.	

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- Use common laboratory instrumentation such as microscopes, pH-meters, scales, thermometer, centrifuge, incubator, autoclave, waterbath, pipettes, micropipettes, magnetic stirers, calipers, spectrophotometer, hemocytometer, refractometer, microtome, colony counter, laminar flow cabinets, inoculation loops/needles/rods/, ELISA machine, vacuum pump, wood's lamp, agglutination plates, McMaster counting slides, Baermann apparatus
- Preserve and process samples for laboratory diagnosis
- Prepare different solutions, buffers and media
- Calculate concentrations and dilutions
- Calibrate common laboratory instruments
- Perform common diagnostic procedures in hematology (hematocrit, PCV, MCV, differential counts, clotting test), urinalysis (determination of urea and creatinine, specific gravity, physical properties of urine, microscopic evaluation) and cytology (bone marrow examination)
- Prepare tissues for microscopic examination
- Perform common diagnostic procedures in bacteriology (bacterial culture, isolation and identification, antibiotic sensitivity test) and mycology (culturing and identification)
- Perform common serological tests (Rose Bengal test, agglutination test, complement fixation test, precipitation test, immunofluorescence test, ELISA)
- Prepare slides for parasitological examination of common internal and external parasites
- Identify the eggs/cysts of common helminths and protozoa
- Perform fecal egg count and larva culture
- Prepare and preserve external parasites
- Design and implement an effective record and reference system in veterinary diagnostic and research/teaching laboratories

Module Content

Common laboratory Instrumentation used in veterinary diagnostic, practice and research/teaching laboratories; measurements, weights and volumes; calculating concentrations and dilutions, preparing solutions, buffers and media; quality control (calibration of instruments, standardization, verification of standard solutions, etc.); common diagnostic procedures in clinical pathology (hematology, urinalysis, cytology), histopathology (tissue preparation for microscopy), microbiology (bacteriology, virology, mycology), immunology (serology) and parasitology (helminthology, protozoology, entomology); effective record keeping and reference systems.

Assessment Strategies

1. Continuous Assessment: 60% (Minimum 2x theory assessments and 5x practical assessments)
2. Examination: 40% (1 x 3 hour paper: 50% and 1x 2hr practical exam: 50%)

Module Title: PARA-PROFESSIONAL ROTATIONS AHT	
Module Code	VAT 2682
NQF Level	6
Contact hours	Rotation (10 weeks)
NQF Credits	56
Prerequisite	All 1 st and 2 nd year modules
Compulsory/Elective	Elective
Semester Offered	2
Module Aims	
This module provides students with practical experience in the field of animal health.	

Learning Outcomes

- Complete the list of activities as reflected in the prescribed logbook

Module Content

Students will complete a 10-week rotation; three (3) weeks at a registered private large animal or mixed veterinary facility and seven (7) weeks at a state veterinary office. During this period students will be required to complete a list of activities as reflected in the prescribed logbook.

Assessment strategies

1. Successful completion of all rotations, and submission of a complete verified and signed off Log Book will serve as examination admission.
2. Examination: 100% (oral/practical examination: 20%; 1x3hr written paper: 80%)

Module Title: PARA-PROFESSIONAL ROTATIONS LT	
Module Code	VVT 2682
NQF Level	6
Contact hours	Rotation (10 weeks)
NQF Credits	56
Prerequisite	All 1 st and 2 nd year modules
Compulsory/Elective	Elective
Semester Offered	2
Module Aims	
This module provides students with practical experience as a laboratory technologist	

Exit Learning Outcomes

- Complete the list of activities as reflected in the prescribed logbook

Module Content

Students will complete a 10-week rotation; Three (3) weeks at a registered private practice laboratory or teaching laboratory and seven (7) weeks at the Central Veterinary Laboratory or equivalent facility. During this period students will be required to complete a list of activities as reflected in the prescribed logbook.

Assessment strategies

1. Successful completion of all rotations, and submission of a complete verified and signed off Log Book will serve as examination admission.
2. Examination: 100% practical examination

E. B.SC. AGRICULTURE (AGRICULTURAL ECONOMICS) HONS (17BSAE)

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

E.1 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					
CEMA3572	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
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		None
					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)
					None
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
Year 3 Semester 1					
AAEA 3701	Field Attachment I*	7	8	C	
ACSE 3781	Agricultural Engineering	7	12	C	None
AAEC 3751	Econometrics	7	16	C	AAEC 3612 (Mathematical Economics & Linear

AAER 3781	Resource Economics	7	12	C	Programming) 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					70
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		None
AAEA 3782	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					138
Year 4 Semester 1					
AACA 3801	Field Attachment II	8	8	C	
AAEC 3810	Research Project in Agricultural Economics	8	16	C	AAER 3782 (Research Methodology in 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					62
Year 4 Semester 2					
AAEC 3810	Research Project in Agricultural Economics	8	16		AAER 3782 (Research Methodology in Agricultural Economics)
AAEC 3882	Agricultural Policy Analysis	8	12		None
AAEA 3882	Agric. Business Management	8	12		None
AASC3892	Small Ruminant Production	8	12		None
AAEC 3842	Rural Development	8	8		AAEC 3712 (Agricultural Extension)
Total credits Semester 2					60
TOTAL CREDITS YEAR 4					122
TOTAL CREDITS FOR THE PROGRAMME					532

E.2 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 description: 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.

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 description: 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: 5

Credits: 8

Prerequisite: None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership.

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,

- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (**100%**), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title:	INTRODUCTION TO BIOLOGY
Code:	SBLG 3511
Course Equivalent:	Biology 1A
NQF level:	4
Contact hours:	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
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.
Prerequisites:	NSCC (Biology C or better)

Module description (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 domain 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.

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 description (Content): Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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.

BASIC MICROECONOMICS CEMI3571

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 Description:

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 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 description: 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 than 10 marked

assignments) 50% Examination: 60% (1 x 2 hour examination paper)

Prerequisites: NSSC (Biology C or better)

Module description (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, Chondrichthyes, 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 name: 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
Assessment: Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite: NSSC Mathematics
Module description (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 Description (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.

BASIC MACROECONOMICS

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 Description:

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 MODULES

PART B: COURSE SPECIFICATION	
Course Title: Intermediate Microeconomics	
Course Code	AAEI 3681
NQF Level	6
Notional Hours	120

NQF Credits	12
Contact hours	3 lectures per week for 14 weeks
Prerequisite	CEMI 3571 Basic Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course exposes students to basic concepts and principles in microeconomics, and provides an essential foundation for higher level agricultural economics courses such as Marketing, Production Economics, and Farm management.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Analyze microeconomic issues and suggest alternative solutions to these issues
2. Evaluate the nature and dynamics of consumers in a market regarding choice, budgeting and preferences
3. Compare and contrast algebraically demand and supply analysis models for consumer and producer behavior
4. Evaluate the notion of consumer equilibrium and utility maximization
5. Discuss the relationship between profit maximization and cost minimization in imperfect markets

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Rural Sociology	
Course Code	AAEC 3691
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	3 lectures per week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course investigates the basic sociological concepts and their application to agricultural progress and rural development	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Understand sociological concept and Analyze the significance of rural sociology to agricultural extension and rural development
2. Compare rural and urban populations and their causes;
3. Analyze different cultures and measure its significance in society
4. Discuss social structure and the role of social institutions in agriculture and rural development;
5. Analyze issues of rural urban migration and environment

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Financial Management	
Course Code	AAEF 3681
NQF Level	6
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to the concepts and tools of financial management and analysis in agribusiness and farming	

<p>Learning outcomes:</p> <p><i>Upon successful completion of this module, students should be able to:</i></p> <ol style="list-style-type: none"> 1. Discuss concepts used in financial management of agribusiness and farming enterprises. 2. Prepare, Analyze and interpret financial statements and ratios and assess profitability, liquidity, solvency and leverage (credit) of enterprises. 3. Understand farm financing by financial institutions. 4. Explain the importance of capital in agriculture, time value of money 5. Explain the concepts of capital structure, leverage and financial risk.

Course 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).

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Agricultural Communication and Group Dynamics	
Course Code	AAEA 3681
NQF Level	6
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to concept of channels of communication; importance of group dynamics, techniques and different leadership styles	

<p>Learning outcomes:</p> <p><i>Upon successful completion of this module, students should be able to:</i></p> <ol style="list-style-type: none"> 1. Discuss the critical factors and problems of effective communication 2. Explain elements that comprise the process of communication 3. Explain the relevance of ICT in agriculture, 4. Establish good effective oral presentation 5. Understanding group techniques and formation of group and analyse the different behaviour and attitude in a group 6. Analyse different leadership styles

Course 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;

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Production Economics	
Course Code	AAEC 3682
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	3 lectures per week for 14 weeks and 1 hour of practical/week
Prerequisite	CEMI 3571 Basic Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
It introduces students to uses of economic principles in the process of decision making for optimal resource allocation and profit maximization in agricultural production	

Learning outcomes:

Upon completion of this Course, students should be able to:

1. Demonstrate an understanding of microeconomic concepts used in agricultural production economics.
2. Determine optimal allocation of resources, and profit maximization.
3. Analyze issues of risk in agriculture and basic production data and
4. Apply appropriate economic tools, concepts to make sound economic decisions.

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Intermediate Macroeconomics	
Course Code	AAEI 3682
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	3 lectures per week for 14 weeks
Prerequisite	CEMA 3572 Basic Macroeconomics
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims to introduce to students the economic aggregates variables that relates to the national economy as a whole.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Analyze macroeconomic issues and suggest alternative solutions to these issues
2. Evaluate the efficacy of macroeconomic policies designed to achieve full employment, price stability, and economic growth, equitable distribution of income and healthy balance of payment situation.
3. Formulate macroeconomic policies relating to unemployment (using the Phillip's curve), inflation,

- and national budgeting,
4. Compare and contrast algebraically IS – LM model and classical and Keynesian economic models
 5. Evaluate money and banking, product market and investment proposals in the context of Namibia

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Mathematical Economics and Linear Programming	
Course Code	AEC 3612
NQF Level	6
Notional Hours	160
NQF Credits	16
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
Course Aims	
The course provides students with the knowledge of mathematical concepts and tools that are often used for proper understanding of agricultural economics	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Explain mathematical concepts commonly used to solve problems in agricultural economics.
2. Identify and assess appropriate typical mathematical tools use to solve economic problems.
3. To apply various mathematical tools (matrix algebra, and calculus) to solve problems in agricultural economics and business.
4. Formulate the linear programming models and determine optimal solutions by simplex methods and through use of linear programming computer based software.
5. Interpret the economic meaning of the mathematical solutions.

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 3 hour paper)

THIRD YEAR MODULES

PART B: COURSE SPECIFICATION	
Course Title: Field Attachment I	
Course Code	AACA 3701
NQF Level	7
Notional Hours	60
NQF Credits	8
Contact Hours	6 weeks of Field Attachment
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
This course aims to reinforce classroom work with practical while exposing students to agricultural economics discipline, agriculture and rural development.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. understand the demand of the work force in the agricultural economics discipline

2. apply knowledge and skills acquired
3. Increase interaction with agro-food industries and other related institutions.

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 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.

Assessment Strategies

40% (Class oral presentation); 60% (report write up.)

PART B: COURSE SPECIFICATION	
Course Title: Econometrics	
Course Code	AAEC 3751
NQF Level	7
Notional Hours	160
NQF Credits	16
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
Course Aims	
The course introduces students to basic concepts in econometrics and provides skills to undertake econometric estimation using OLS methods.	

Learning outcomes:
<i>Upon successful completion of this module, students should be able to:</i>
<ol style="list-style-type: none"> 1. Describe the classical linear regression model and its assumptions 2. Formulate and estimate an econometric model using relevant data. 3. Formulate and test hypotheses and interpret results and produce a report. 4. Identify and rectify problems of violations of OLS assumptions in a multiple regression model. 5. Use relevant computer software to do econometric and basic statistical analysis

Course 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 multicollinearity, autocorrelation, heteroscedasticity, functional forms, dummy variables, and estimation using appropriate computer software (e.g. SPSS or STATA)

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 3 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Resource Economics	
Course Code	AAER 3781
NQF Level	7
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to the concepts of natural resource and environmental economics and how they are applied in agriculture and related fields.	

Learning outcomes:
<i>Upon successful completion of this module, students should be able to:</i>
<ol style="list-style-type: none"> 1. Apply the principles of economics to identify causes and consequences of natural resource problems in developing and developed countries. 2. Evaluate and identify appropriate environmental and natural resources policy instruments for optimal use of natural resources, under different circumstances. 3. Develop an understanding of the economic valuation tools and valuation techniques used in

- natural resource economics and management
4. Analyze resource management issues and their relationship to property rights, externalities and discount rate.

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Farm Planning and Management	
Course Code	AAEC 3781
NQF Level	7
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to essential functions of management (planning, implementation, and control) and skills which are essential to managing, advising, and/ or servicing farm enterprises and other agribusinesses.	

Learning outcomes:

Upon completion of this Course, students should be able to:

1. Discuss functions of management and decision-making process of a farm business.
2. Understand and discuss the management principles and concepts to apply in managing a farm business successfully.
3. Formulate, compare and appraise farm financing plans.
4. Identify strategies for dealing with risk and uncertainty in the farm business.
5. Apply budgeting techniques and computer skills to analyze farm enterprise budgets and conduct whole farm planning.

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Development Economics	
Course Code	AAED 3781
NQF Level	7
Notional Hours	120
NQF Credits	12
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
Course Aims	

This course introduces students to development theories and application to economic problems facing developing countries.

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Identify and describe economic problems facing developing countries.
2. Analyze why some poor nations experienced rapid economic development while others are stuck in poverty.
3. Calculate various measures of income inequality and poverty.
4. Evaluate theories of economic development in terms of their condition and ability to explain observed phenomena.
5. Appreciate the roles of agricultural markets in development.
6. Judge whether increased international trade has been beneficial to developing countries or not.
7. Identify the conditions that may lead to a balance of payment crisis.
8. Analyze the effectiveness of foreign aid on development.

Course content:

This course is an introduction to the field of development economics, focusing on some key questions such as: why some countries are 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 country's 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Research Methodology in Agricultural Economics	
Course Code	AAER 3782
NQF Level	7
Notional Hours	120
NQF Credits	12
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
Course Aims	
This course exposes students to basic concepts of research methodology and the types of research employed in the field of agricultural economics.	

Learning outcomes:

Upon completion of this Course, the student should be able to:

1. Apply critical thinking in problem identification and literature review.
2. Understand the research process and be able to apply it in developing a research proposal.
3. Distinguish types of research and sampling methods, and be able to analyze research data and produce a research paper.

Course Content:

The course includes issues such as: identifying research problems, defining research problem, and formulation, data collection, data analysis, presentation and report writing.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION

Course Title: Agricultural Extension	
Course Code	AAEC 3712
NQF Level	7
Notional Hours	160
NQF Credits	16
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
Course Aims	
The course exposes students to concepts of extension, principles and theories of extension, their role and application in agricultural extension and sustainable agricultural development.	

Learning outcomes:

Upon completion of this Course, students should be able to:

1. Assess and evaluate the need for extension and its role in sustainable agricultural development.
2. Analyze the various methods and approaches to agricultural extension
3. Identify workable and effective extension strategies.
4. Understanding the elements of diffusion and innovations
5. Plan and implement an extension activity/service

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 3 hour paper)

Course Title: Entrepreneurship	
Course Code	AAEC 3702
NQF Level	7
Notional Hours	80
NQF Credits	8
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
Course Aims	
The course introduces students to the concepts of entrepreneurship	

Learning outcomes:

Upon successful completion of this module, students should be able to:

6. Explain the entrepreneurial process, origin and its importance
7. Analyze the characteristics of an entrepreneur and their role in the economy
8. Analyze the major factors in business opportunity identification and how to write a business plan to exploit those opportunities
9. Discuss the concept of Innovation and the source of innovation

Course 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).

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Agricultural Price Analysis and Forecasting	
Course Code	AAEA 3782
NQF Level	7
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to	

Learning outcomes:

Upon completion of this Course, students should be able to:

1. Define price, price determination and price discovery
2. Explain the concept of index numbers, price movement trend analysis and least square regression in price forecasting
3. Explain the relationship between data series and cycles
4. Discuss the concept of seasonality
5. Explain the concept of price discovery models and causality

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Agricultural Marketing	
Course Code	AAEC 3782
NQF Level	7
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course introduces students to concepts and theory in agricultural marketing and will provide skills required in management of efficient agricultural marketing systems in developing countries.	

Learning Outcomes:

At the end of this course students should be able to:

1. Foster an understanding of marketing functions and the complex of food agricultural and food marketing systems.
2. Develop skills on how to apply economic analytical tools to understand the market forces that affect agricultural prices.
3. Appreciate the basics mechanisms of futures markets for hedgers and speculators and learn how these may be used to reduce economic risk.
4. Conduct market research and analyze the internal and marketing environment of a farm or an agribusiness firm for a strategically planned and executed business plan
5. Analyze and develop enhancing skills in managing supply chains for key Namibia's Agricultural Products

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

FOURTH YEAR MODULES

PART B: COURSE SPECIFICATION	
Course Title: Field Attachment II	
Course Code	AACA 3801
NQF Level	8
Notional Hours	60
NQF Credits	8
Contact Hours	8 practical hours per day for 6 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
This course aims to reinforce classroom work with practical while exposing students to agricultural economics discipline, agriculture and rural development.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. understand the demand of the work force in the agricultural economics discipline
2. apply knowledge and skills acquired
3. Increase interaction with agro-food industries and other related institutions.

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 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.

Assessment Strategies

40% (Class oral presentation); 60% (report write up.)

PART B: COURSE SPECIFICATION	
Course Title: Research Project in Agricultural Economics	
Course Code	AAEC 3810
NQF Level	8
Notional Hours	320

NQF Credits	32
Contact Hours	1 hour per week for 28 weeks
Prerequisite	AAER 3782 Research Methodology in Agricultural Economics
Compulsory/Elective	Compulsory
Semester Offered	1 & 2
Course Aims	
The aim of this course is to develop student's skills in initiating and executing a scientific research project in specific area of Agricultural economics and related fields.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Develop a research project proposal.
2. Implement a research project; analyze/interpret data and write up
3. Enhanced communications skills: high quality presentations to a wide audience.
4. Carry out supervised scientific project with maturity and a degree of independence.

Course 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.

PART B: COURSE SPECIFICATION	
Course Title: Project Planning and Management	
Course Code	AAEC 3881
NQF Level	8
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to principles and applications of project planning and management in agriculture	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Describe the project cycle and management concepts
2. Identify and formulate plans of sound agricultural projects among alternative development opportunities which are likely to accelerate economic development most rapidly;
3. Identify project benefits and target groups and weaknesses and risks and provide remedial measures
4. Identify various types and sources of data (technical) required in project planning and management.
5. Use economic and financial analysis techniques to evaluate projects.
6. Manage and monitor agricultural projects.
7. Use best practices in agricultural project planning and management in order to improve project sustainability.

Course 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

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: International Agricultural Trade	
Course Code	AAEC 3891
NQF Level	8
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to concepts and theories of international agricultural trade and policy for exporting countries and importing countries	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Discuss the rationale for domestic and international trade in agriculture, key concepts and trade theories and their application in agricultural trade.
2. Explain different trade policies for SADC and none SADC countries and emerging issues on trade agreements and regional economic integration.
3. Evaluate the welfare effects of trade policies on exporting and importing nation's economic welfare (consumer welfare, producer welfare, society welfare, government) and gains/losses and dead weight losses thereof.

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Agricultural Policy Analysis	
Course Code	AAEC 3882
NQF Level	8
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course exposes students to fundamental concepts of policy analysis and the welfare analysis using the partial equilibrium framework.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Comprehend and apply economic principles to the analysis of agricultural policy issues, food safety, nutrition and food security of developing countries.
2. Assess the macro economic variables which affects the agricultural economy
3. Describe macroeconomic tools that are used to influence those variables
4. Assess the driving forces of commercialization of subsistence agriculture and aspects of contract farming

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Agribusiness Management	
Course Code	AAEA 3882
NQF Level	8
Notional Hours	120
NQF Credits	12
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
Course Aims	
The course introduces students to the concepts of entrepreneurship and agribusiness formulation	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Explain the agribusiness management process and its importance
2. Perform industry competitive analysis
3. Discuss the process of strategy formulation, implementation and control
4. Discuss strategy implementation and control

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

PART B: COURSE SPECIFICATION	
Course Title: Rural Development	
Course Code	AAEC 3842
NQF Level	8
Notional Hours	80
NQF Credits	8
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
Course Aims	
The course exposes students to theories and issues of rural development and skills to manage rural development projects in developing countries.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Explain the concept of rural development and its importance in poverty reduction and increasing food security.
2. Evaluate rural development models and strategies and their relevance to local situations.
3. Identify lessons of good practices in order to enhance rural development and sustainable development.
4. Apply knowledge of rural development theories and practices and work as a change agent interdisciplinary teams to support integrated rural development efforts.
5. Plan and manage agricultural projects that are in line with priority rural development programmes.

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment); Examination 60% (1 x 2 hour paper)

SECOND YEAR AGRICULTURAL ECONOMICS MODULES TAUGHT AS SERVICE MODULES TO OTHER DEPARTMENTS:

Course Title:	PRINCIPLES OF MICROECONOMICS
Course Code	AAEC 3681
NQF Level	6
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course exposes students to basic concepts and principles in microeconomics, and provides an essential foundation for higher level agricultural economics courses such as Marketing, Production Economics, and Farm management.	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 1. Define basic microeconomics concepts 2. Explain the concept of resource scarcity 3. Explain concept of demand and supply 4. Explain the concept of consumer theory 5. Discuss the concept of theory of the firm 6. Differentiate between the market structures 7. Explain externalities and public goods 	

Course Content

The course includes issues such as: introduction to the concept of scarcity, consumer theory, , the theory of the firm under perfect competition, supply and demand, monopoly and other market structures, externalities, and public goods.

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals); Examination: 60% (01 x 02 hours paper)

Course Title:	PRINCIPLES OF MACROECONOMICS
Course Code	AAEC 3692
NQF Level	6
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks; 03 Practical hours / alternate week for 14 weeks
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course introduces the students to basics concepts in macroeconomics and functioning of the economy in aggregate	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 1. Define macroeconomics concepts; 2. Describe several macroeconomic variables; 3. Explain the national accounting models; 4. Explain the concept of aggregate demand and aggregate supply (IS and LM curves) 5. Use macroeconomic theory to predict the movements of the key economic indicators; 6. Evaluate the effectiveness of macroeconomic policy (fiscal and monetary policy) 	

Course 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.

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals); Examination: 60% (01 x 02 hours paper)

F. B.SC. AGRICULTURE (ANIMAL SCIENCE) HONS [17BSAS]

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

F.1 PROGRAMME SCHEDULE

Coursecode	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
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
AASC 3691	Introduction to Range Management	6	12	C	None
Total Credits Semester 1					60
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
ACSC 3691	Agronomy	6	12	C	None
AFST 3602	Food Technology	6	8	C	None
ACSC 3692	Biostatistics	6	12	C	None
Total credits Semester 2					68
TOTAL CREDITS YEAR 2					128
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 3791	Animal Health	6	12	C	FST 3681 (General

					Microbiology)
AASC 3741	Game Ranching	7	8	C	None
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	ACSC 3692 (Biostatistics)
AAEC 3712	Agricultural Extension	7	16	C	None
AASF 3702	Feeds and Feeding	7	8	C	AASC 3701 (Animal Nutrition)
AASC 3792	Animal Breeding	7	12	C	AASC 3681 (Genetics)
AAEC3782	Agricultural marketing	7	12	C	None
AAEC 3702	Entrepreneurship	7	8	C	None
Total credits Semester 2					64
TOTAL CREDITS YEAR 3					140
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		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					544

F.2. 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 description: 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.

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 description: 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:	5
Credits:	8
Prerequisite:	None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership.

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (**100%**), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title:	INTRODUCTION TO BIOLOGY
Code:	SBLG 3511
Course Equivalent:	Biology 1A
NQF level:	4
Contact hours:	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
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.
Prerequisites:	NSSC (Biology C or better)

Module description (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 domain 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 description (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 description (Content):** Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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 description:** 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 Description:**

This module is designed for students that have insufficient background in chemistry and for non-chemistry majors .It is an introduction to topics in general and organic chemistry, and biochemistry. The following will be covered:

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 description (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.

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 than 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSSC (Biology C or better)
Module description (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 Myxiniiformes, Petromyzontiformes, Placoderms, Chondrichthyes, 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

Course Title: GENETICS	
Course Code	AASC 3681
NQF Level	6
Notional Hours	120
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)
Prerequisite	Introduction to Biology (BLG 3411)
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims To present advanced genetic concepts covering general genetics, with particular emphasis on molecular genetics. Examples are used from different species of eukaryotes and prokaryotes.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Explain the modified Mendelian ratio.
- Apply the principles of inheritance, including multiple allelism, lethal alleles, gene interactions, and sex-linked transmission.
- Discuss the structure, function and variations of chromosomes.
- Discuss the types of mutations, causes and detection methods.
- Describe the molecular structure of DNA and its functional role in encoding genetic material.
- Explain the significance of genetic variations.
- Discuss sex determination in eukaryotic species.
- Describe the basic aspects of the flow of genetic information from DNA to proteins and self-replication.
- Explain basic molecular techniques such as DNA extraction, PCR, DNA sequencing and gene cloning

Course 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 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.

Assessment Strategies

Continuous Assessment: 40% (2 tests + at least 5x marked practicals / assignments).

Exam: 60% (1 x2 hour paper).

Course Title: INTRODUCTION TO RANGE MANAGEMENT	
Course Code	AASC 3691
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours:	3 x 1 hour Lecturers / week for 14 weeks; 03 Practical hours alternate weeks for 14 weeks
Prerequisite	
Compulsory/Elective	Compulsory

Semester Offered	1
Course Aims	
This course aims to develop the students' understanding, skills and attitude regarding range management through coverage of the following: Namibian range types in the farming areas of Namibia; Overview of the Namibian rangeland resources.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Explain the importance of rangelands to the Namibian economy
- Demonstrate how you would distinguish between various trophic levels.
- Identify range plants and, discuss their roles on range.
- Explain the effect of climate change on the rangelands.
- Explain how farmers can manage their rangelands sustainably.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: BIOCHEMISTRY	
Course Code	AASC 3612
NQF Level	6
Notional Hours	160
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)
Prerequisite	Chemistry for Life Sciences (CHM3532)
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims: This course is designed to help students gain key concepts of biochemistry of living cells so as to comprehend life process in both plants and animals.	

Learning outcomes: Upon completion of this course the student should be able to:

- Describe acids, bases, buffers and P^H
- Describe the chemical structures and functions of carbohydrates, proteins, lipids, vitamins and coenzymes
- Explain the role of enzymes in biological systems and discuss the factors affecting enzyme activities.
- Describe the concepts of enzyme kinetics, enzyme inhibition and allosterism
- Distinguish between water soluble and fat soluble vitamins and describe the functions of vitamins in animal nutrition
- Discuss catabolic biochemical reactions such as glycolysis, TCA cycle, that take place in living tissues to provide energy in the form of ATP.
- Discuss anabolic biochemical processes such as pentose phosphate pathway and gluconeogenesis
- Describe the glyoxylate cycle in oily seeds
- Describe the more common laboratory tests for determining the presence of sugars, proteins and lipids

Course 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.

ENZYMOLGY:(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.

Assessment Strategies

Continuous Assessment: 40% (2 tests + at least 5x marked practicals / assignments).

Exam: 60% (1 x3 hour paper).

Course Title: LIVESTOCK PRODUCTION SYSTEMS	
Course Code	AASC 3602
NQF Level	6
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
Prerequisite	
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims to cover the role of livestock and agriculture in the national economy and gives a broad overview of the industry, potentials, competitiveness and constraints.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Discuss the different livestock production systems in Namibia.
- Discuss the contribution of the livestock industry to the Namibian economy.
- Explain the influence of nutrition, health, breeding and management on livestock production and productivity.
- Discuss climate and environmental factors affecting productivity.
- Discuss the impact of livestock on the environment, diversity and water resources.
- Show how livestock contribute to sustainability of agricultural production.
- Discuss the challenges facing the livestock industry and strategies to address them.

Course 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

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals).

Exam: 60% (1 x2 hr paper)

THIRD YEAR MODULES

PART B: COURSE SPECIFICATION	
Course Title: Field Attachment I	
Course Code	AACA 3701

NQF Level	7
Notional Hours	60
NQF Credits	8
Contact Hours	6 weeks of Field Attachment
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
This course aims to reinforce classroom work with practical while exposing students to agricultural economics discipline, agriculture and rural development.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

4. understand the demand of the work force in the agricultural economics discipline
5. apply knowledge and skills acquired
6. Increase interaction with agro-food industries and other related institutions.

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 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.

Assessment Strategies

40% (Class oral presentation); 60% (report write up.)

Course Title: ANIMAL NUTRITION	
Course Code	AASC 3701
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
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module trains students in pertinent animal nutrition concepts and analytical techniques in assessing the feeding value and potential role of animal nutrition in animal production.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Discuss the different livestock feed resources in Namibia.
- Describe the major feed nutrients and discuss their importance to livestock.
- Discuss the contribution of feed analysis and evaluation to livestock production.
- Explain the influence of vitamin and mineral nutrition to farm animal.
- Discuss factors affecting nutritive value of feedstuffs.
- Contrast the digestive systems of different livestock species.
- Compare and contrast digestion and absorption of feed in ruminants and non-ruminants.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals); Exam: 60% (1 x2 hr paper)

Course Title: ANIMAL HEALTH

Course 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
Prerequisite	FST 3681 (General Microbiology)
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
Students are introduced to concepts pertaining to all livestock types of parasites at a phylum, subphylum, class, family, genera, and species level. The understanding of definitions of parasitism, symbiosis and commensalisms are emphasized, Evolution of parasitism, structural, physiological and behavioral adaptations of parasites are emphasized. Students acquaint themselves with the basic understanding of the relationship between morphology, habitat, distribution, life cycles and modes of transmitting diseases by parasites. Economic and socio-cultural importance in domestic animals and methods of control are discussed.	

Learning Outcomes:

Upon successful completion of this module, students should be able to:

- Describe how environmental factors affect disease outbreaks
- Explain various disease control methods
- Diagnose diseases using various techniques
- Distinguish between infectious and non-infectious diseases of livestock
- Know reservoirs of infection of livestock diseases
- Classify livestock parasites as internal or external
- Describe lifecycles of animal parasites
- Outline the seasonal occurrence of parasitic diseases
- enumerate economic importance of parasitic diseases
- Explain control measures of parasitic diseases
- Describe the distribution of parasitic diseases in Namibia

Course 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, immunity 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, Demodocosis. Ticks – hard and soft ticks, Lice, Flies, Fleas,

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals); Exam: 60% (1 x2 hr paper)

Course Title: Game Ranching	
Course 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
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course aim to familiarizes students with Game Ranching issues in Namibia and develops the students' understanding, skills and attitude pertinent to Game Ranching taking into account topics conservation of biodiversity in the rangelands.	

Learning outcomes

Upon successful completion of this module, students should be able to:

- Manage game animals as sound and economically as possible.
- Conduct out routine practices as found in a game ranch, park or Lodge.
- Demonstrate a thorough comprehension on the importance & establishment of, and the legal requirements for conservancies.
- Relate the game industry in Namibia including role players, functionality, policies, imports and exports to the socio-economic and technological challenges.
- Identify game animals using either physical or non-physical characteristics.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 10 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: ANIMAL ANATOMY AND PHYSIOLOGY	
Course 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
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
Students are introduced to concepts pertaining to the morphology function of the circulatory, respiratory, nervous, skeletal and locomotory systems of farm animals (ruminants, mono-gastric animals, and poultry).	

Learning outcomes

Upon successful completion of this module, students should be able to:

- Describe the structures and functions of various body organs and tissues.
- Understand interrelationships between body systems.
- Explain how various body systems are integrated to work as one organism.
- Identify body organs morphologically by visual examination

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals).

Exam: 60% (1 x3 hr paper)

Course Title: FEEDS AND FEEDING
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Course Code	AASF 3702
NQF Level	7
Notional Hours	80
NQF Credits	8
Contact Hours	2 x 1 hour Lectures / week for 14 weeks; 02 Practical hours alternate week for 14 weeks
Co-requisite	Animal Nutrition (AASC 3701)
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module trains students in applied feeds and feeding concepts and acquaints students to ways of improving feeding value of low quality feedstuffs.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Advise producers on different animal feeding regimes.
- Students should be able interpret animal feeding tables and feeding standard values and their use in feed formulation.
- Students should be able to design livestock pen feeding programs that exploit the livestock market.
- Students should also have an understanding of the role of feed formulation and feed manufacturing processes on feed quality in livestock improvement operations.
- Use feeding standards & tables and, predict feed intake of different livestock.
- Advise farmers on best feeding strategies.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals). Exam: 60% (1 x2 hr paper)

Quality assurance arrangements

- 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

Course Title: ANIMAL BREEDING	
Course Code	AASC 3792
NQF Level	7
Notional Hours	80
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 02 Practical hours alternate week for 14 weeks
Prerequisite	Genetics (AASC 3601)
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims to equip students with concepts and methods on the application of population and quantitative genetics principles to the genetic improvement of livestock and poultry.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Explain key principles in population genetics including Hardy-Weinberg equilibrium, forces that change gene frequencies and their relevance to animal breeding.
- Compute measures of variation and association for variables (mean, variance, standard deviation, coefficient of variation, correlation, regression) from data sets and interpret.
- Describe methods for estimating heritability.
- Discuss principles of selection, sources of information used in selection, aids to selection, multiple trait selection.
- Compute and interpret inbreeding coefficients, relationship coefficients.
- Explain the phenotypic and genotypic effects of inbreeding and heterosis.
- Discuss categories of commercial livestock breeding programmes (straight breeding, rotational crosses, terminal sire systems, combination systems, composites).
- Discuss performance and progeny testing programmes in dairy and beef cattle.
- Discuss current applications of DNA technologies in livestock improvement and the challenges.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (7 x assignments + 2 tests + 1 written report).

Exam: 60% (1 x2 hr paper)

FOURTH YEAR MODULES**PART B: COURSE SPECIFICATION****Course Title: Field Attachment II**

Course Code	AACA 3801
NQF Level	8
Notional Hours	60
NQF Credits	8
Contact Hours	8 practical hours per day for 6 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
This course aims to reinforce classroom work with practical while exposing students to agricultural economics discipline, agriculture and rural development.	

Course Aims**Learning Outcomes**

Upon successful completion of this module, students should be able to:

4. understand the demand of the work force in the agricultural economics discipline
5. apply knowledge and skills acquired
6. Increase interaction with agro-food industries and other related institutions.

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 agricultural businesses such as 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.

40% (Class oral presentation); 60% (report write up.)

Course Title: RESEARCH PROJECT	
Course Code	AASC 3810
NQF Level	8
Notional Hours	320
NQF Credits	32
Contact hours:	32 hours
Prerequisite	CSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
The course aims to develop students' ability and skills to carry out an investigation by following the scientific methodology, on an identified research problem. Critical and creative thinking is also enhanced through material search in the library, conducting the experiment or field survey under the guidance of their supervisor(s).	

Learning Outcomes

Upon successful completion of this module, students should be able to:

- Design and report on an experiment in a way that will permit it to be replicated.
- Integrate theory from different courses and use it to solve a practical problem.
- Carry out appropriate statistical analysis using a software package.
- Communicate results of scientific investigation in oral and written reports.
- Write a research proposal of acceptable quality.
- Perform laboratory procedures independently.
- Recommend the appropriate format for presenting and interpretation of results.

Course Content: Research based.

Methods of facilitation of learning

Lectures, written assignments, group work, class discussions and presentations.

Assessment Strategies

Continuous Assessment: Continuous assessment 40% (oral presentation) 60% Project write-up

Course Title: RANGE AND PASTURE MANAGEMENT	
Course Code	AASC 3811
NQF Level	8
Notional Hours	160
NQF Credits	16
Contact Hours	4 x 1 hour Lectures per week; practicals: 4 hr per week. Duration of 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course aims to develop 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.

Learning outcomes

Upon successful completion of this module, students should be able to:

- Construct modes of plant succession using the known models and theories.
- Demonstrate successful establishment of cultivated pastures.
- Identify range plants and, discuss their roles on range, proneness to defoliation and the conservative grazing management you would adopt for all.
- Determine the carrying capacity of rangelands.
- Advise farmers on rangeland rehabilitation.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x3 hr paper)

Course Title: BEEF PRODUCTION	
Course 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
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course aims to train students in beef cattle production systems, animal selection and breeding, calving and calf management, sound beef cattle husbandry techniques and the marketing of beef cattle.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Carry out animal husbandry practices such as identification, castration, dehorning, vaccination etc.
- Draw up a herd management calendar.
- Outline the slaughter procedure for slaughtering beef cattle.
- Describe carcass classification.
- Discuss strategies for drought management in Namibia.
- Explain livestock and livestock products traceability.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: POULTRY PRODUCTION	
Course Code	AASC 3821
NQF Level	8
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
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course develops the students' understanding in poultry feeding, health, housing, general management, breeding and marketing.	
Learning Outcomes:	
<i>Upon successful completion of this module, students should be able to:</i>	
<ul style="list-style-type: none"> • Explain routine management techniques for poultry including feeding, health, general management and breeding. • Describe different housing requirements (floor space, feeder and water space) for poultry. • Discuss feed formulation in broiler and poultry chickens. • Discuss strategies for disease prevention and control and ways to address emerging disease threats e.g. avian influenza. • Discuss aspects of hatchery management. • Discuss recent developments in the Namibian poultry industry. 	

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: SMALL RUMINANT PRODUCTION	
Course Code	AASC 3882
NQF Level	8
Notional Hours	120
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 02 Practical hours / week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course develops the students' understanding in feeding habits of sheep and goats, grazing	

management, nutrient requirement of sheep and goats, animal selection and livestock marketing.

Learning Outcomes:

Upon successful completion of this module, students should be able to:

- Describe the feeding habits of sheep and goats and manage grazing and feeding operations for profitable farming.
- Determine the nutritional requirements of different classes of sheep and goats at different levels of production.
- Explain the factors that should be considered when selecting breeding and market ready animals.
- Design mating operation schemes of small ruminants to get advantages of early breeding in sheep and goats.
- Conduct the different husbandry techniques such as identification, castration, tail docking, hoof trimming, record-keeping etc.
- Discuss the main aspects of livestock marketing, traceability and animal welfare

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: DAIRY PRODUCTION	
Course Code	AASC 3802
NQF Level	8
Notional Hours	80
NQF Credits	8
Contact hours:	2 x 1 hour Lectures / week for 14 weeks; 02 Practical hours alternate weeks for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims at training students dairy husbandry and practices to enable them participate effectively in dairy industry development in Namibia so as to improve and increase human nutrition.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

- Describe the setup of a dairy farm
- Discuss the importance and challenges of the dairy industry
- Discuss lactation physiology
- Explain how milk is formed, let down and the milking process.
- Discuss aspects of dairy husbandry with respect to animal health, feeding and breeding.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: MEAT SCIENCE	
Course Code	AASM 3882
NQF Level	8
Notional Hours	120
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 02 Practical hours / week for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims to train students in muscle physiology and carcass composition and emphasize the importance on handling meat, preservation, storage as well as public health hazards.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

- Outline carcass classification for cattle, sheep, goats and chicken.
- Explain the microanatomy of skeletal muscle and its importance in carcasses quality.
- Differentiate normal from abnormal muscle growth and development.
- Process and preserve meat and meat products.
- Develop abattoir hygiene plans that incorporate the knowledge of microbiology, general layout and construction designs, personal hygiene habits, handling of waste and condemned material, pest control, sanitation and meat quality and safety.
- Explain factors affecting meat quality.
- Choose appropriate packaging and storage options for meat and meat products and livestock products
- Discuss public hazards with regard to the consumption of meat.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 10 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: BIOTECHNOLOGY OF ANIMAL REPRODUCTION	
Course Code	AASB 3882
NQF Level	8
Notional Hours	120
NQF Credits	12
Contact Hours	3 x 1 hour Lectures / week for 14 weeks; 03 Practical hours alternate weeks for 14 weeks
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims to develop the students' understanding, skills and attitude regarding modern animal	

Learning outcomes

Upon successful completion of this module, students should be able to:

- Advise producers on techniques for accelerating animal reproduction and selection
- Advise producers on how to shorten the interval between parturitions through synchronization of reproductive cycles and artificial insemination;
- Apply genetic engineering for embryo manipulations enabling a production of multiple offsprings of improved genetic merit;
- Collect, evaluate, process semen and oocytes aimed at *in vitro* fertilization and/or cryopreservation;
- Perform *in vitro* embryo culture, evaluation, grading and either transfer to female recipient or use for scientific purposes

Course 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;

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals).

Exam: 60% (1 x2 hr paper)

Course Title: PIG PRODUCTION	
Course Code	AASC 3822
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
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course aims to introduce students to methods of pig farming in both intensive and extensive systems. It also aims to exposes students to routine management practices performed in pig industries.	

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5 marked practicals); Exam: 60% (1 x2 hr paper)

G. B.SC. AGRICULTURE (CROP SCIENCE) HONS (Ogongo Campus) [17BSCS]

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

G.1 PROGRAMME SCHEDULE

Course code	Course name	NQF Level	Credits	Compulsory (C) / Elective (E)	(Co-requisite) / Pre-requisite
Year 1 Semester 1					
ULCE 3419	English for Communication and Study Skills	4	8	C	
UCL 3509	Computer Literacy	5	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	
SMAT 3512	Pre-calculus	5	16	C	
Total credits Semester 2			80		
TOTAL CREDITS YEAR 1			152		
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
ACSC 3681	Plant Science	6	12	C	None
ACSS 3681	Soil Science for Crop Production	6	12	C	None
ACSC 3691	Agronomy	6	12	C	None
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
ACSC 3692	Biostatistics	6	12	C	None
Total credits Semester 2			64		
TOTAL CREDITS YEAR 2			136		
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

ACSC 3741	Horticulture I—Vegetables, Herbs and Spices	7	8	C	ACSC 3681 (Plant Science) and ACSC 3691 (Agronomy)
ACRS 3781	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 3692 (Biostatistics)
ACSC 3702	Crop Ecophysiology	7	8	C	ACSC 3681 Plant Science
ACSC 3722	Crop Handling and Storage	7	8	C	None
ACSC 3742	Farm mechanisation	7	8	C	ACSE 3781 (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			
Year 4 Semester 1					
ACSC 3810	Research Project	8	16	C	ACSC 3792 (Research Methods)
AACA 3801	Field Attachment II	8	8	C	None
ACSC 3841	Seed Science and Technology	8	8	C	CSC 3681 (Plant Science)
ACSC 3861	Agricultural Entomology	8	8	C	None
ACSC 3881	Soil Fertility and Plant Nutrition	8	12	C	ACSS 3681 (Soil Science for Crop Production)
AAEC 3881	Project Planning and Management		12	C	None
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	ACSS 3681 (Soil Science for Crop Production)
Total credits Semester 2		60			
TOTAL CREDITS YEAR 4		120			
TOTAL CREDITS FOR THE PROGRAMME				544	

G.2 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 description: 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.
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 description: 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: 5
Credits: 8
Prerequisite: None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership.

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,

- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (100%), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title:	INTRODUCTION TO BIOLOGY
Code:	SBLG 3511
Course Equivalent:	Biology 1A
NQF level:	4
Contact hours:	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
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.
Prerequisites:	NSCC (Biology C or better)

Module description (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 domain 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 description (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 description (Content): Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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 description: 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: SCHM3523

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 Description:

This module is designed for students that have insufficient background in chemistry and for non-chemistry majors. It is an introduction to topics in general and organic chemistry, and biochemistry. The following will be covered:

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 description (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.

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 than 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSSC (Biology C or better)

Module description (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 Myxiniiformes, Petromyzontiformes, Placoderms, Chondrichthyes, 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 name: 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
Assessment: Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite: NSSC Mathematics

Module description (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.)

PART B: COURSE SPECIFICATION:	
Course Title:	PLANT SCIENCE
Course Code	ACSC 3681
NQF Level	6
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding and skills regarding agricultural botany and plant physiology as a basis for plant production. Concepts covered will form the core understanding to be applied in most of the subsequent modules in agronomy, crop improvement and horticulture	
Learning Outcomes/Specific Outcomes	
On completing the course students should be able to:	
1. Recognize the functions and role of various plant organs	
2. Describe range of physiological processes in plants	
3. Compare and contrast the relationship between plants and their environment	
4. Discuss the environmental factors which influence plant growth and development	

Course 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 turgor pressure. Translocation: sources and sinks. Nutrient uptake and transport: passive and active transport. Plant growth regulators.

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	AGRONOMY
Course Code	ACSC 3691
NQF Level	6
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks; 03 Practical hours / week for 14 weeks (alternate)
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding and skills regarding the basic principles and practices of field and horticultural crops	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Prepare timely land management practices for optimum crop establishment and growth	
2. Assess factors affecting seeding and stand establishment	
3. Describe major tillage and cultivation practices	
4. Describe cropping systems suitable for different categories of farmers	

Course 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	SOIL SCIENCE FOR CROP PRODUCTION
Course Code	ACSS 3681
NQF Level	6
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module aims to develop the student's understanding of soil as a medium for plant growth. Concepts covered enhance understanding of soil, land and crop management strategies	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Describe the process of soil formation to appreciate the soil as a triphasic system	
2. Recognize and identify different soil texture	
3. Describe the basic interaction of soil fertility and plant nutrition	
4. Employ soil sampling methods	
5. Describe soil water and plant relationships	

Course 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

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	BIOSTATISTICS
Course Code	ACSC 3692
NQF Level	
Notional Hours	120
Contact hours	3 lecture hours / week for 14 weeks; 3 tutorial / practical hours alternate weeks for 14
NQF Credits	12
Prerequisite	SMAT 3511 Basic Mathematics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module introduces students to concepts of statistics and experimentation. It prepares students to design, execute and analyse experiments and present findings in formats that are understandable to other researchers and the public	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 1. Perform calculations in basic statistics and probability 2. Validate research hypothesis on the basis of statistical inference tools 3. Demonstrate understanding scientific research methodology 4. Design experiments, collect data, analyse and interpret 5. Present statistical data in formats acceptable for scientific writing and public consumption 	

Course 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.

Assessment Strategies

Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 02 hour examination paper

THIRD YEAR MODULES

Course Title:	FIELD CROP PRODUCTION
Course Code	ACSC 3791
NQF Level	7
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
NQF Credits	12
Prerequisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module further develops a student's understanding and skills on soil and crop management that were covered in in general earlier modules. These concepts are given detailed application to specific crops and crop categories	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 1. Interpret environmental conditions for optimum production of field crops 2. Know the economic importance of field crops to Namibia 3. Describe limitations to field crop production in given geographical areas 	

Course Content

Cereals crops (pearl millet, maize, wheat, sorghum, rice), oilseed crops (sunflower, soybean, groundnut, castor 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

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	AGRICULTURAL ENGINEERING
Course Code	ACSE 3781
NQF Level	7
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks 02 Practical hours / week for 14 weeks
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding and skills regarding basic agricultural engineering concepts that are relevant in executing crop management practices	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Recognize the different farm machinery and power sources of farm power	
2. Describe the components of an internal combustion engine and their functions	
3. Demonstrate soil and water erosion processes and conservation methods in agriculture	
4. Evaluate the role of irrigation and drainage in crop production	

Course 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.

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	HORTICULTURE I—VEGETABLES, HERBS AND SPICES
Course Code	ACSC 3741
NQF Level	7
Notional Hours	80
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
Course Aims	
This module develops a student's understanding of principles and practices employed in the production of vegetables, herbs and practices. Building on concepts presented in earlier modules, the course gives in-depth application of crop and soil management principles to specific crop species and categories of crop species that comprise vegetables, herbs and spices	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Describe the important concepts of nursery cultivation and management	
2. Describe the cultivation of fruit, leaf, root vegetable crops in relation to soil and climatic requirements and crop management practices	
3. Evaluate important concepts in suitable hydroponics systems to Namibia, the economic comparative advantages to field production and the management of infrastructure	

Course 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.

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	WEED SCIENCE
Course Code	ACSC 3721
NQF Level	7
Notional Hours	80
Contact hours	2 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding of weeds in order to formulate crop management strategies to minimise yield reduction in crops caused by weeds	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Relate the characteristics of weeds to their effects on crop growth	
2. Identify and classify weed species common in crop producing areas	
3. Assess weed-crop competition and interference in farms	
4. Formulate weed control strategies to alleviate weed problems faced by farmers	
5. Evaluate herbicide selectivity and effects on important weed species	

Course 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	FIELD ATTACHMENT I
Course Code	AACA 3701
NQF Level	7
Notional Hours	60
Contact hours	6 weeks
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module is designed to expose students to practical experience of actual operations on farms, agro-industries, and research institutions in Namibia	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Demonstrate the attainment of practice-oriented experiences beyond the classroom in executing high quality crop farming activities	
2. Increase interaction with key agronomic role players and/or public service activities designed to enhance food, agricultural and natural resource system.	

Course 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.

integrity; supervisor consultations promoted; evaluate course delivery.

Assessment Strategies

Final assessment 100% (Attachment report and Oral Presentation)

Course Title:	PLANT BREEDING
Course Code	ACRS 3781
NQF Level	7
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	12
Prerequisite	AASC 3681 Genetics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding of techniques for improvement of crop cultivars and germplasm conservation and utilisation	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Design a breeding nursery for improvement of specific crop traits.	
2. Design breeding strategies of important crops	
3. Discuss importance of plant reproduction systems of important crops	
4. Discuss germplasm assembly, storage and utilisation	

Course 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: mutagenesis, haploid and polyploidy plants, somaclonal variation, marker assisted selection and gene transfer.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	RESEARCH METHODS
Course Code	ACSC 3792
NQF Level	7
Notional Hours	120
Contact hours	03 lecture hours / week for 14 weeks; 3 tutorial hours / practical hours alternate weeks for 14 weeks
NQF Credits	12
Co-requisite	ACSC 3692: BIOSTATISTICS
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module further develops the student's understanding of research concepts that were not covered in Biostatistics and to design, execute, analyse and present research findings.	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Perform calculations with non-parametric data and make statistical inferences	
2. Design experiments, analyse, interpret and present results	
3. Design field surveys, collect data, analyse and interpret results	
4. Utilise computer software in controlled experiments and field survey data analysis	

5. Evaluate critical results of experiments published in journal articles

Course 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

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	CROP ECOPHYSIOLOGY
Course Code	ACSC 3702
NQF Level	7
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Pre-requisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding regarding environmental crop physiology. It advances concepts of plant physiology covered in the Plant Science module and applies them to yield formation in crop plants	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Analyze plant growth based on environmental factors affecting optimum development	
2. Explain biological nitrogen fixation and its relevance to plant growth	
3. Assess the effects of abiotic and biotic stresses on crop growth and development	
4. Identify factors affecting plant growth, fruit development and harvestable yield	

Course 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 abscission. Physiology of stress – abiotic (heat, acidity, water) and biotic stresses.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	CROP STORAGE AND HANDLING
Course Code	ACSC 3722
NQF Level	7
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding and skills regarding post-harvest principles, processing, storage and handling of crops	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Describe the post-harvest system and properties of crops in storage	
2. Illustrate the importance and factors necessary for drying harvested produce before storage	

3. Employ mechanisms for processing cereals, grain legume and horticultural crops, including the management of grain storage structures
4. Identify the various types of drying methods used for grain and horticultural crops
5. Assess the threshing and shelling efficiency and accomplishment of grain crops

Course 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

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	FARM MECHANISATION
Course Code	ACSC 3742
NQF Level	7
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding and skills regarding farm machinery operation applied in the production of crops	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Determine the functional requirements of different farm equipment	
2. Apply the principles of efficient operations of a wide range of agricultural machinery	
3. Compare and contrast primary and secondary tillage systems under various farm power sources	
4. Determine the operational efficiency of various combine harvesters based on cropping objective and machine capacity	

Course 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

FOURTH YEAR MODULES

Course Title:	RESEARCH PROJECT
Course Code	ACSC 3810
NQF Level	16
Notional Hours	320
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
Course Aims	
This module develops a student's capability to carry out independent investigation, namely to plan, execute, analyse and report a research topic	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Demonstrate basic and/or advanced field and laboratory research skills	
2. Demonstrate problem-solving and enhanced communications skills	
3. Demonstrate knowledge and skill of using computers in research	
4. Prepare research results for publication in scientific journals	

Course 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.

Course Title:	FIELD ATTACHMENT II
Course Code	AACA 3801
NQF Level	8
Notional Hours	60
Contact hours	6 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module is designed to further expose students to practical experience of actual operations on farms, agro-industries, and research institutions in Namibia	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Demonstrate the attainment of practice-oriented experiences beyond the classroom in executing high quality crop management activities	
2. Increase interaction with key agronomic role players and/or public service activities designed to enhance food, agricultural and natural resource system	

Course 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.

Course Title:	SEED SCIENCE AND TECHNOLOGY
Course Code	ACSC 3841
NQF Level	8
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Pre-requisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding and skills regarding seed science and technology concepts. It prepares the student for industrial practice as a seed manager or inspector.	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Apply the principles of crop variety breeding and seed multiplication for economically important crops	
2. Know environmental requirements for seed production	
3. Explain the importance of seed analysis and seed germination on seed production	
4. Describe seed quality control, grading, inspection, packaging and testing measures	

Course 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 affecting storage: 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	AGRICULTURAL ENTOMOLOGY
Course Code	ACSC 3861
NQF Level	8
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks 03 Practical hours / alternate week for 14 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding and skills regarding insect crop pests and how to manage them to minimise crop damage that results in yield and quality reduction, as well as storage losses	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Identify insect pests of importance to economic crops grown in Namibia	
2. Evaluate insect pest problems and their interactions with host crops	
3. Investigate and alleviate insect pest problems faced by farmers	
4. Describe the internal and external anatomy of a generalized insect	

Course 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	SOIL FERTILITY AND PLANT NUTRITION
Course Code	ACSC 3881
NQF Level	8
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks 02 Practical hours / week for 14 weeks
NQF Credits	12
Pre-requisite	ACSS 3681 Soil Science for Crop Production
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module develops a student's understanding and skills regarding soil fertility and plant nutrition in order to maximise crop growth and yield in both optimal and sub-optimal soil conditions	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Explain the role of major nutrients and their availability for plant nutrition	
2. Analyze the soil condition for plant nutrients and predict plant growth its suitability for plant growth	
3. Work out fertilizer formulas and devise fertilizer application programs for specified crops	

Course Content

Soil organic matter: carbon cycle, CO₂ global warming, bioassay, response to management practices. Review of plant nutrients: macronutrients, micronutrients. . 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	HORTICULTURE II—Fruit Crops and Ornamental Plants
Course 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
NQF Credits	12
Pre-requisite	ACSC 3681 Plant Science
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding of principles and practices employed in the production of fruits and ornamental plants. Building on concepts presented in earlier modules, the course gives in-depth application of crop and soil management principles to specific crop species and categories of fruit crops, flowers and ornamental plants	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
1. Distinguish between cultivation systems of various fruit and nut crops, stimulant plants, ornamental and landscape plants	
2. Devise appropriate management systems for fruit tree nurseries	
3. Apply pre- and post-harvest technology practices used in commercial horticulture	
4. Explain environmental factors affecting plant growth and development	
5. Select ornamental and landscaping cultivars which are suitable to purpose and location.	

Course 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	PLANT PATHOLOGY
Course Code	ACSC 3802
NQF Level	8
Notional Hours	80
Contact hours	02 Lecture hours / week for 14 weeks 02 Practical hours / alternate week for 14 weeks
NQF Credits	8
Pre-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding and skills regarding plant diseases and how to manage them in order to minimise their effects crop yield and quality	
Learning Outcomes/Specific Outcomes	
<ol style="list-style-type: none"> 1. Identify fungal, viral and bacterial diseases of economic crops in Namibia 2. Formulate a sustainable disease management strategy for a given situation 3. Access crop losses due to diseases 4. Conduct correct pesticides application measures 5. Operate instruments used in pathology and practice aseptic conditions required in pathology laboratory 	

Course 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.

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	PLANT BIOTECHNOLOGY
Course 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
NQF Credits	8
Pre-requisite	AASC 3681 Genetics
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module develops a student's understanding and skills regarding plant biotechnology both for the production of crops with novel methods and to offer effective biosafety advice to policy makers and the public	
Learning Outcomes/Specific Outcomes	
<p><i>Upon successful completion of this module, students should be able to:</i></p> <ol style="list-style-type: none"> 1. Apply the principles of genetic engineering in plant improvement 2. Employ tissue culture technology for crop improvement and propagation purposes 	

3. Compare and contrast somaclonal variations and hybrids
4. Explain biochemical and molecular markers
5. Discuss application of Bio-safety procedures in Namibia

Course 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.

Assessment strategies

continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

Course Title:	SOIL CONSERVATION AND IRRIGATION
Course Code	ACSC 3812
NQF Level	8
Notional Hours	160
Contact hours	04 Lecture hours / week for 14 weeks 03 Practical hours / week for 14 weeks
NQF Credits	16
Pre-requisite	ACSC 3601 Soil Science for Crop Production
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course develops a student's understanding, skills and attitude regarding soil degradation and conservation as well as use of water in irrigated agriculture and	
Learning Outcomes/Specific Outcomes	
<i>Upon successful completion of this module, students should be able to:</i>	
<ol style="list-style-type: none"> 1. Describe sound soil and water management principles to maintain and enhance productivity of agricultural lands 2. Describe the erosion processes and suitable erosion control measures and distinguish between the various models of estimating soil loss 3. Apply various formulae to determine crop water requirements, irrigation application rates and scheduling 4. Design an irrigation project and analytically assess the advantages and disadvantages 5. Analytically compare the various methods of drainage of irrigated lands 	

Course 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.

Assessment Strategies

Continuous Assessment: 40% (1x assignments + 2 tests + at least 3 marked practicals).
Exam: 60% (1 x3 hr paper)

H. B.SC. AGRICULTURE (FOOD SCIENCE & TECHNOLOGY) HONS [17BSFS]

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

H.1 PROGRAMME SCHEDULE

Course Code	Course name	NQF Level	Credits	Compulsory (C) /Elective (E)	(Co-requisite)/Pre-requisites
Year 1 Semester 1					
UCLC 3509	Computer Literacy	5	8	C	None
ULCE 3419	English Communication and Study Skills	4	16	C	None
UCSI 3580	Contemporary Social Issues	5	8	C	None
SBLG 3511	Introduction to Biology	4	16	C	None
SPHY 3501	Physics for Life Sciences I	5	8	C	None
SMAT 3511	Basic Mathematics	5	16	C	None
Total Credits Semester 1					72
Year 1 Semester 2					
ULEA 3519	English for Academic Purposes	5	16	C	None
SCHM 3532	Chemistry for Life Sciences	5	16	C	None
SPHY 3532	Physics for Life Science II	5	16	C	None
SBLG 3512	Diversity of Life	5	16	C	None
SMAT3512	Pre-calculus	5	16	C	None
Total credits Semester 2					80
TOTAL CREDITS YEAR 1					152
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
AAST 3681	General Microbiology	6	12	C	None
AFST 3691	Post-Harvest Technology	6	12	C	None
AAST 3601	Human Nutrition	6	8	C	None
Total Credits Semester 1					68
Year 2 Semester 2					
ACSC 3692	Biostatistics	6	12	C	None
AASC 3612	Biochemistry	6	16	C	SCHM3532 (Chemistry for Life Sciences)
AFST 3682	Fruits and Vegetable Technology	6	12	C	None
AASC 3602	Livestock Production Systems	6	8	C	None
AFST 3602	Food Technology	6	8	C	None
AFST 3692	Food Biotechnology	6	12	C	
Total Credits Semester 2					68
TOTAL CREDITS YEAR 2					136
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	7	12	C	AFST 3602 (Food

Course Code	Course name	NQF Level	Credits	Compulsory (C) /Elective (E)	(Co-requisite)/Pre-requisites
	Technology				Technology)
AFSC 3781	Meat Science & Technology	7	12	C	FST 3602 (Food Technology)
Total Credits Semester 1					62
Year 3 Semester 2					
ACSC3792	Research Methods	7	12	C	ACSC3692 (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					122
Year 4 Semester 1					
AFST 3810	Research Project	8	16	C	CSC 3792 (Research Methods)
AACA 3801	Field Attachment II	8	8	C	None
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					62
Year 4 Semester 2					
AFST 3810	Research Project	8	16	C	CSC 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					126
TOTAL CREDITS FOR THE PROGRAMME					536

H.2 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 description: 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.

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 description: 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:	5
Credits:	8
Prerequisite:	None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership.

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and

- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (100%), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title:	INTRODUCTION TO BIOLOGY
Code:	SBLG 3511
Course Equivalent:	Biology 1A
NQF level:	4
Contact hours:	4 lectures/ week for 14 weeks and one 3-hour practical session per week.
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.

Prerequisites: NSCC (Biology C or better)

Module description (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 domain 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 description (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 description (Content): Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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 description: 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 Description:

This module is designed for students that have insufficient background in chemistry and for non-chemistry majors .It is an introduction to topics in general and organic chemistry, and biochemistry. The following will be covered:

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 description (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.

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 than 10 marked

assignments) 50% Examination: 60% (1 x 2 hour examination paper)

Prerequisites: NSSC (Biology C or better)

Module description (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 Myxiniiformes, Petromyzontiformes, Placoderms, Chondrichthyes, 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 name:	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
Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module description (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

Course Title: POST HARVEST TECHNOLOGY	
Course Code	AFST3691
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	Three Lecture hours / week for 14 weeks; 03Practical hours / week for alternating weeks. Duration of 14 weeks.
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course imparts an in depth knowledge on the physiology and biochemical reactions prevalent in agricultural products before and after ripening and harvesting. It familiarizes students with predisposing factors to postharvest losses of common national grains and the possible ways to circumvent these losses.	

Learning Outcomes:

- Upon successful completion of this module, students should be able to
1. Discuss different type of produce and their response to specific postharvest situations
 2. Identify main factors causing postharvest losses
 3. Contrast between climacteric and non-climacteric / environmental conditions
 4. Analysis of the pre-harvest losses
 5. Predict transportation spillage
 6. Identify all physiological stages of fruits and vegetables
 7. discuss developmental stages of growth, maturation, ripening until senescence
 8. contrast between CAS and MAP
 9. Discuss the effects of primary and secondary processing
 10. Discuss the effects of microorganisms and pests
 11. Employ postharvest treatments to increase the shelf life of fruits and vegetables
 12. Assess the quality of fruits and vegetables.

Course 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 its 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Exam: 60% (1 x 3 hr paper).

Course Title: GENERAL MICROBIOLOGY	
Course Code	AFST 3681
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	Three Lecture hours / week for 14 weeks; 03 Practical hours / week for alternating weeks. Duration of 14 weeks.
Prerequisite	
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course provides students with in-depth knowledge about the different groups of microorganisms; growing and controlling microorganisms, their effect to plant human and animal health as well as the environment. It imparts in depth knowledge about the prokaryotic cell external and internal features. It also describes the biology and taxonomy of prokaryotes, eukaryotes, and viruses.	

Learning Outcomes:
<i>Upon successful completion of this module, students should be able to:</i>
1. Describe known groups of microorganisms and microscopic particles; and describe the diversity of microbial habitats.
2. Describe methods of prokaryotic taxonomy.
3. Propagate microorganism and identify them on the basis of structure and morphology.
4. Describe and use aseptic and pure culture techniques
5. Demonstrate the ability to control the growth and survival of microorganisms.
6. Describe the mode of feeding, reproduction and habitat of fungi, algae, protozoa and viruses
7. Be able to describe important pathogens of plants and animals and how their importance to the economy in Namibia

Course 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.

Assessment Strategies

Continuous Assessment 40% (minimum 2 tests, 2 assignments and 4 practicals). Examination: 60% (1 x 2hr paper)

Course Title: HUMAN NUTRITION	
Course Code	AFST 3601
NQF Level	6
Notional Hours	80
Contact hours	Two Lecture hours / week for 14 weeks; 03 Practical hours / week for alternating weeks. Duration of 14 weeks.
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course aims to cover all aspects of food nutrients, digestion, nutrients deficiency disorders & excesses, BMI, BMR & PAL, formulation of balanced ratios, food toxicology, intolerance and allergies and the role of	

nutrition in respect to HIV/AIDS.

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Carry out anthropometric measurements, Mass Index (BMI), Basal Metabolic Rate (BMR) and Physical Activity Level (PAL)
2. Determine nutritional disorders resulting from deficiencies and excesses
3. Describe the cause of Blindness, Marasmus, Kwashiorkor, Obesity and other macronutrient deficiencies such as Rickets and Anaemia.
4. Formulate Balanced ration for each group of people
5. Describe methods of preservation of nutrients, causes of food intolerances and allergies.
6. Explain the role of nutrition with respect to HIV/AIDS

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals). Exam: 60% (1 x2hr paper)

Course Title: FRUITS AND VEGETABLES TECHNOLOGY	
Course Code:	AFST 3682
NQF Level	6
Notional Hours	120
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hrs practicals every two week. Duration of 14 weeks.
Prerequisite	NONE
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course discloses relevant information on different types of fruits and vegetables; their structure, composition, preservation, processing methods and value addition.	

Learning Outcomes

On completing the course students should be able to:

1. Interpreted the nutritional quality of fruits and vegetables
2. Discuss the quality of fruits and vegetables for processing
3. Determine the maturity of the products for harvesting and processing
4. Discuss the types of products that can be processed from fruits and vegetables
5. Discuss the methods of preservation that can be used for the products
6. Discuss the similarities and differences between fruits and vegetables
7. Discuss the modes of processing suitable for fruits and vegetables
8. Determine the appropriate preservatives and methods of packaging.
9. Explain the role of fruits and vegetables in our diets
10. Discuss the nutrients available in fruits and vegetables and their importance in diet.
11. Compare the nutritional quality between fruits and vegetables
12. Differentiate traditional methods of preservation from the modern methods
13. Determine the appropriate packaging systems for the value added products for distribution.

Course 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).

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)

Course Title: FOOD TECHNOLOGY	
Course Code	AFST 3602
NQF Level	6
Notional Hours	80
NQF Credits	8
Contact hours	Two hours of lectures per week, three hours practicals every two week. Duration of 14 weeks.
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims:	
The course aims to provide knowledge of available local and exotic technologies and the effect of various processing methods on food quality and nutrition. The course gives an insight into the existing food laws and food quality management systems	

Learning Outcomes: Upon successful completion of this module, students should be able to:

1. Develop plans for teaching
2. Appreciate the meaning and importance of food technology.
3. Discuss the importance of food industries in Namibia and the region
4. Discuss impact of food technology on traditional foods and diets
5. Discuss influence of technology on the culture and civilization on food consumption in Namibia
6. Discuss the implication of population growth on the advancement of food technology.
7. Describe food laws and quality management systems put in place to monitor food safety.
8. Design learning sessions and experiences
9. Explain the role of food technology in maintaining supply of food to world populations
10. Discuss processing and preservation methods used to control spoilages and shelf life of foods
11. Describe methods used in food technology to prevent hazards in foods.
12. Discuss technological methods of converting raw food materials to value added products
13. Discuss issues of attitudes towards food handling, preservation, processing, packaging and distribution.

Course 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.

Assessment strategies

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Exam: 60% (1 x 2hr paper)

Course Title: FOOD BIOTECHNOLOGY	
Course Code	AFST 3692
NQF Level	7
Notional Hours	120
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks.
Prerequisite	
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
It introduces students to concepts and techniques of recombinant DNA technology and their application to food processing and preservation	
Learning outcomes:	
Upon completion of this Course, students should be able to:	

1. Demonstrate an understanding of the importance, implications and current trends in food biotechnology
2. Demonstrate an understanding of principles and applications of genetic engineering including recombinant DNA techniques ; action and use of restriction enzymes, DNA cloning, into various vectors including yeasts, plasmids and cosmids
3. Demonstrate the understanding of gene transfer into microbial, mammalian and plant cells; cell transformation and transfection respectively..
4. Discuss the techniques used in microbial synthesis and production techniques; including single cell protein, single cell oil, and antimicrobial substances and cloning.
5. Demonstrate an understanding of immobilization, downstream processing, fermentations, and scale up techniques.
6. Demonstrate an understanding of the Namibian biosafety legal framework.

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 3 hour paper)

THIRD YEAR MODULES

Course title: FIELD ATTACHMENT 1	
Course code	AACA3701
NQF level	7
Notional hours	60
NQF credits	8
Contact hours	None
Prerequisite	None
Compulsory/elective	Compulsory
Semester offered	1
Course Aims: The course exposes students to practical realities in the food processing and food quality control industries.	

Learning Outcomes/Specific Outcomes On completing the course students should be able to: 1. Apply skills and techniques acquired from food industry to theories in solving problems once encountered. 2. Describe the demand of the work force in food industries and increase interaction with food industries and other related institutions.

Course 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.

Assessment strategies:

Final assessment 100% (Attachment report and oral presentation).

Course Title: FOOD CHEMISTRY	
Course Code	AFST 3781
NQF Level	7

Notional Hours	120
NQF Credits	12
Contact hours	Three hours of lectures per week, three hours practicals every two week. Duration of 14 weeks.
Prerequisite	Biochemistry AASC 3612:
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims This course aims to provide students with the in-depth knowledge of the chemical composition of compounds found in food. The role of each component and trace minerals in human nutrition. Functional groups in foods and the effect that various processing methods on macromolecules and trace minerals.	

Learning Outcomes/Specific Outcomes Upon successful completion of this module, students should be able to: 1. Carry out food chemistry tests on foods: 2. Apply appropriate food processing and preservation methods to foods so as ensure food quality. 3. Describe the procedures used in demonstrating the compositional components of the food without using sophisticated modern equipment 4. Analysing for specific food borne pathogens. 5. Explain the roles and functions of water, carbohydrates, amino acids, proteins, lipids, minerals, vitamins food additives, and enzymes in real life situation

Course 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Exam: 60% (1 x 2hr paper)

Course Title: FOOD MICROBIOLOGY	
Course Code	AFST 3791
NQF Level	7
Notional Hours	120
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks s
Prerequisite	General Microbiology AFST 3681:
Compulsory/Elective	Compulsory
Semester Offered	1

Course Aims

The course raises awareness about the presence of, how to detect and control microorganisms in foods using various processing and preservation techniques

Learning Outcomes/Specific Outcomes

On completing the course students should be able to:

1. Demonstrate understanding of rationale and competency in carrying out microbiological food quality analysis
3. Demonstrate the ability to count isolate and identify microorganisms in food sample using both classical and modern methods.
4. Demonstrate the ability to use various media to isolate microorganisms from food samples.
5. Describe appropriate food processing and preservation methods used to foods ensure food quality.
6. Describe the procedures used in demonstrating the general quality of the food without analyzing for specific food borne pathogens.
7. Choose the right sampling plan for the particular specific food item.

Course 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 1 assignment and 3 practicals). Exam: 60% (1 x 2 hr paper)

Course Title: PRODUCT DEVELOPMENT AND SENSORY EVALUATION	
Course 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.
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course imparts applied knowledge in the design and development of food products that meet discerning consumer requirements. The principles of food processing, food chemistry, nutrition, sensory analysis and product marketing are employed.	

Learning Outcomes/Specific Outcomes

On completing the course students should be able to:

1. Discuss the process of new product development
2. Apply problem diagnosis for product refinement
3. Design and conduct a small consumer study
4. Perform market evaluation and identify product market trends
5. Evaluate the sensory characteristics, cost and nutritional content of the product.
6. Draft product briefings
7. Work in a team to apply food science and technology principles to develop a food product.

8. Describe the physiological functions and organs involved that enable humans to sense food
9. Evaluate how Sensory Evaluation relates to the typical product life cycle
10. Plan the steps that need to take place prior administering Sensory Evaluation
11. Prepare and deliver screening tests for sensory panel

Course 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)

Course Title: FOOD PROCESSING TECHNOLOGY	
Course Code	AFST 3791
NQF Level	7
Notional Hours	120
NQF Credits	12
Contact hours	Two hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks.
Prerequisite	AFST 3602 Food Technology
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims This course develops the students understanding of the principles and practices employed in food processing in particular the technologies employed in unit operations common to the food industry.	

Learning Outcomes/Specific Outcomes On completing the course students should be able to: <ol style="list-style-type: none"> 1. Discuss the importance of food processing and preservation; 2. Construct a process flow diagram for the preparation of a food product; 3. Appraise the different unit operations used in the production of food 4. Employ different techniques to increase the shelf life of foods. 5. Assess the quality of a food product
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Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course Title: MEAT SCIENCE AND TECHNOLOGY	
Course Code	AFSC 3781
NQF Level	7

Notional Hours	120
NQF Credits	12
Contact hours	Three hours of lectures per week, 03 hours practicals every two week. Duration of 14 weeks.
Prerequisite	AFST 3602: Food Technology
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course informs students about the structure and composition of meat, the effect of methods of handling of meat animals prior to slaughter, the importance of hygiene in the slaughter house, proper slaughter methods and the various products prepared from different parts of a carcass and by various methods of meat processing and preservation.	

Learning Outcomes/Specific Outcomes
<i>Upon successful completion of this module, students should be able to:</i>
1. Emphasize on recent developments in the understanding of stress and physical injuries that occur before and during transport to slaughter, during handling at livestock markets, and at the time animals are put-up for slaughter within abattoirs.
2. Discuss factors influencing meat quality
3. Identify the wholesale cuts, retailing of fresh meat and kinds of meat packaging
4. Processing of meat products such as dried meat, cured meat, canned cured meat, uncured/cooked or uncooked/seasoned or unseasoned/ with or without additives
5. Identify all kinds of meat by-products.

Course 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, meat storage, 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)

COURSE TITLE: FOOD TOXICOLOGY	
Course Code	AFST 3702
NQF Level	7
Notional Hours	80
NQF Credits	8
Contact hours	Two lecture hours / week for 14 weeks; 03 practical hours alternate weeks for 14 weeks.
Prerequisite	FST 3781 Food Chemistry
Compulsory/Elective	Compulsory
Semester Offered	2

Course Aims

This course develops students understanding on the types and methods of analyzing natural poisons occurring in foods.

Learning Outcomes/Specific Outcomes

On completing the course students should be able to:

1. Determine the lethal doses and NOEL for any substances regarded as toxic.
2. Describe the application of the relative dose , lethal dose curves and LD50 concepts
3. Describe the steps involved in intoxication process in a living body; absorption, translocation, storage, and excretion.
4. Perform qualitative and quantitative toxicity tests of food samples
5. Differentiate types of toxicity.
6. Describe chemical reactions involved in detoxification in living tissues.
7. Identify types of toxins associated with various food substances; animal toxins, plant associated toxins, and mycotoxins, heavy metals, pesticides, insecticides, food additives and chlorinated hydrocarbons.
8. Discuss various biochemical mechanisms of toxicity.
9. Discuss the possible toxic effects of different processing methods on various food items

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course Title: FOOD ANALYSIS AND INSTRUMENTATION	
Course Code	AFST 3722
NQF Level	7
Notional Hours	120
NQF Credits	8
Contact hours	Two lecture hours / week for 14 weeks; 03 practical hours alternate weeks for 14 weeks.
Prerequisite	Food Chemistry AFST 3781
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course imparts knowledge on techniques, principles and recommended applications regarding sampling, proximate analysis and special analysis for the main components in foods, carbohydrate, protein and fats. It also includes biochemical and instrumental methods including chromatography, spectroscopy and thermal analysis. The principles of chemistry, biochemistry and food chemistry are employed.	
Learning Outcomes/Specific Outcomes	
On completing the course students should be able to:	
<ol style="list-style-type: none"> 1. Differentiate between accuracy and precision 2. Describe key terms related to physical and chemical food analysis 3. Discuss the basic principles of food analysis analytical techniques 4. Explain the theory and operation of food analysis instrumentation 5. Evaluate appropriate instrumental procedures to solve a specific food analysis problems 	

6. Describe the advantages and disadvantages of methods used for food analysis

Course 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)

Course Title: PRINCIPLES OF FOOD ENGINEERING	
Course Code	AFSC 3782
NQF Level	7
Notional Hours	120
NQF Credits	12
Contact Hours	Three hours lectures per week for 14 weeks; 03 hours practical alternate week for 14 weeks.
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims This course introduces the student to concepts of process engineering through the quantitative description of unit operations related to food processing operations.	

Learning Outcomes/Specific Outcomes On completing the module students should be able to: 1. Predict the input and output process streams of a processing plant using mass and energy balances. 2. Perform thermal process design as well as basic design of heat exchange equipment 3. Determine energy requirements in a fluid flow system 4. Evaluate the efficiency of driers 5. Design basic refrigeration systems using pressure- enthalpy diagrams.
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Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

FOURTH YEAR MODULES

Course Title: RESEARCH PROJECT	
Course Code	AFST 3810

NQF Level	8
Notional Hours	160
NQF Credits	16
Contact Hours	Equivalent to 1 hour per week for 14 weeks.
Prerequisite	ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims This course develops the students' ability and skill to conduct a scientific research project in a current topic in the field of food science or processing and communicate the findings through a scientific report.	

Learning Outcomes/Specific Outcomes On completing the module students should be able to: 1. Formulate a fully-fledged research proposal. 2. Explain the rationale behind research, and important components in research 3. Organize and undertake data collection 4. Analyze the research data using appropriate techniques and interpret the results 5. Write a scientific report 6. Present the research proposal and research findings.
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Course 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.

Assessment Strategies:

Oral Presentations 20% (10% x 2 presentations) Project Write-up 80%

Course Title: FIELD ATTACHMENT II	
Course Code	AACA 3801
NQF Level	8
Notional Hours	60
NQF Credits	6
Contact hours	None
Prerequisite	AACA3701: Field Attachment I
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims The course fortifies the practical experience gained the previous year with AFST 3708: Field Attachment I in the farming and agro-industry operations in Namibia.	

Learning Outcomes/Specific Outcomes On completing the module students should be able to: 1. Apply theories to solving problems once encountered in the food industry 2. Describe the demand of the work force in food industries and increase interaction with food industries
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and other related institutions

Course 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.

Assessment strategies:

Final assessment 100% (Attachment report, oral presentations, and confidential reports by field supervisors).

Course Title: QUALITY MANAGEMENT SYSTEMS	
Course Code	AFST 3841
NQF Level	8
Notional Hours	80
NQF Credits	8
Contact hours	Two lectures per week for 14 weeks
Prerequisite	AFST 3602: Food Technology
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course develops critical thinking with regard to Quality Management Systems. It enables students to become familiar with international standards such as ISO 9001, ISO/IEC 17025, ISO 22000, Codex Alimentarius and OIE. It also teaches students how to develop quality assurance programmes such as HACCP and Risk assessment and/or analysis.	

Learning Outcomes/Specific Outcomes
Upon successful completion of this module, students should be able to: 1. Identify practical elements to food industry staff worldwide for the continuous professional development. 2. Discuss improvements and communicate effectively with policy makers and with colleagues in multi-disciplinary teams. 3. Identify the general requirements for the competency to carry out tests including sampling 4. Select appropriate standards methods, non-standard methods or laboratory-developed methods and validate them before usage 5. Identify international standards for use by laboratories in developing their management systems for quality, administrative and technical operations 6. Compare the effectiveness of different Quality Management Systems for their testing and calibration activities, that includes the principles of ISO 9001, ISO 14000, HACCP, Codex Alimentarius, 7. Discuss Good Manufacturing Practices, personal and good hygiene practices, sanitation and sanitizers 8. Explain how to develop a HACCP plan through all stages of HACCP plan development. Prompts, process flow diagrams, the principles of the HACCP system, the verification principle, providing examples and suggestions on how to improve on HACCP system

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course Title: DAIRY SCIENCE AND TECHNOLOGY	
Course Code	AFST 3881
NQF Level	8
Notional Hours	120
NQF Credits	12
Contact hours	Three lectures per week for 14 weeks; 03 hours Practical every alternate week for 14 weeks.
Prerequisite	Food Processing Technology AFSC 3791; Food Microbiology AFST 3791:
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course introduces students to milk production, preservation, collection, transportation to the processing facilities, processing technologies and value addition including quality control and marketing.	

Learning Outcomes/Specific Outcomes
On completing the module students should be able to:
1. Appreciate milk synthesis from the udder of healthy animals, secretion and milk let down by oxytocin.
2. Discuss normal milk composition, colostrum and mastitis milk.
3. Milk preservation methods, collection and transportation to the processing facility.
4. Determine methods of accepting and rejecting low quality milk
5. Determine quality tests for accepting and rejecting milk at the farm and reception sites.
6. Determine methods of milk value addition into cream, butter, pasteurized, sterilized and UHT milks, toned/recombined/reconstituted milk, starter cultures, fermented milk products, cheeses, milk powder, condensed/evaporated milk and ice creams.
7. Determine methods of packaging, storage and distribution of quality products.
8. Discuss hygiene, sanitation, CIP and COP methods of cleaning, HACCP and ISO Standards.
9. Explain the role of milk and milk products in nutrition and diets
10. Formulates methods of processing and calculating ingredients needed for each type of products.
11. Describe basic methods of products processing and actual production of milk commodities.
12. Discuss methods of milk and milk products handling, storage and distribution.
13. Describe methods of products spoilage and causes and methods of controlling spoilages.

Course 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper).

Course Title: APPLIED FOOD ENGINEERING	
Course Code	AFST 3891
NQF Level	8
Notional Hours	120
NQF Credits	12
Contact hours	Three lectures per week for 14 weeks; 03 hr Practical every alternate week for 14 weeks.
Prerequisite	None

Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims This course develops the students understanding of the application of engineering to common food processing operations with specific reference to process and auxiliary equipment.	

Learning Outcomes/Specific Outcomes On completing the course students should be able to: 1. Select appropriate processing equipment for operations in food industry; 2. Predict process times for heating and cooling operations; 3. Evaluate suitability and performance of food processing equipment; 4. Appraise process control systems commonly employed in the food processing plants. 5. Discuss current trends of food engineering.
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Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course Title: FOOD PACKAGING, STORAGE AND DISTRIBUTION	
Course Code	AFST 3861
NQF Level	8
Notional Hours	80
NQF Credits	8
Contact hours	Two lectures per week for 14 weeks; 03 hours Practical for 3 hours every alternate week for 14 weeks.
Prerequisite	AFST 3602 Food Technology; AFST 3791 Post Harvest Technology
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims The course aims to acquaint students with essentials and importance of packaging, functions of packaging, types of packaging and their chemical and physical effects on food. The course also covers the importance of packaging in preservation, transportation, labeling and marketing aspects.	

Learning Outcomes/Specific Outcomes On completing the course students should be able to: 1. Appreciate the meaning and importance of food packaging 2. Discuss their importance as containment of safe food products 3. Discuss the effects of packaging in food preservation 4. Discuss the types of packaging and methods of manufacturing them. 5. Describe the characteristics of each type of packaging and their effects on food. 6. Discuss their ability to prevent permeability of water, air and microbes into food. 7. Discuss the role of new packaging technologies to prevent spoilage; aseptic, free-oxygen, oxygen absorbers, gas exchange, vacuum, alcohol generation packaging, labeling and distribution. 8. Explain the role of packaging in preservation, containment, marketing and distribution. 9. Identify packaging for different products to prevent physico-chemical effects on foods. 10. Compare each type of packaging and the food they contain for quality maintenance. 11. Discuss the importance of labeling in upholding the right of consumers and marketing. 12. Compare the cost involved in returnable containers versus non returnable's and their advantages and disadvantages. 13. Discuss the types of labeling needed for maximum marketing and consumer information about the
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products.

Course 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.

Assessment strategies

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practical). Examination: 60% (1 x 2hr paper).

Course Title: SEA FOODS TECHNOLOGY	
Course Code	AFST 3862
NQF Level	8
Notional Hours	80
NQF Credits	8
Contact hours	Two lectures per week for 14 weeks; 03 hours Practical for every alternate week for 14 weeks.
Prerequisite	AFST 3602 Food technology
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims The course provides students with in depth knowledge and comprehensive understanding of key issues in seafood technology.	

Learning Outcomes/Specific Outcomes On completing the module students should be able to: 1. Describe the classification of fish and seafood; 2. Explain the biological factors affecting processing; 3. Discuss the nutritional composition of fish and seafood: protein, fats and oil content, minerals; 4. Describe the post mortem changes in fish and seafood; 5. Discuss the Microbiology and Microbial Spoilage/ Health Hazards for fish and seafood; 6. Describe Quality Assurance, Quality Assessment / Food Safety for fish and seafood; 6 .Discuss the harvesting and the handling of fish and seafood; 7. Discuss Sanitation, Good Manufacturing practice, personal hygiene, housekeeping and pest control; 8. Explain how to develop a HACCP plan through all stages of HACCP plan development. Prompts, process flow diagrams, the principles of the Hazard Analysis Critical Control Points system, the verification principle, providing examples and suggestions on how to design a HACCP verification system; 9. Describe cooling mechanisms for fish and seafood and temperature danger zones.
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Course 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.

Assessment strategies:

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2hr paper)

Course Title: CEREAL SCIENCE AND TECHNOLOGY	
Course Code	AFST 3882
NQF Level	8
Notional Hours	120
NQF Credits	12
Contact hours	Three lectures per week for 14 weeks;03 hours Practical for every alternate week for 14 weeks.
Contact hours	
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims The course provides students with a critical understanding of the science and technologies involved in processing of cereals.	

<p>Learning Outcomes/Specific Outcomes</p> <p>On completing the course students should be able to:</p> <ol style="list-style-type: none"> 1. Describe the structure of cereals such as wheat, corn, rice, barley, sorghum, and pearl millet. 2. Explain the characteristics of the starch granule and chemical composition of the starch granule, heating of starch in water, gelling and retrogradation, modified starches, conversion of starch to sweeteners. 3. Discuss the structure and classification of protein in cereal, properties of the protein solubility groups, wheat proteins, and proteins in other cereals. 4. Describe the minor constituents of cereals e.g. non starchy, polysaccharides, sugars and oligosaccharides, enzymes, vitamins and minerals. 5. Explain the storage of cereals, basic types of storage, moisture for safe storage, drying of cereals, aeration, microflora and mycotoxins, insects and rodents. 6. Discuss the dry milling of cereals, the milling process, grain cleaning, tempering or conditioning, roller milling, dry corn milling, decortication or attrition milling. 7. Describe the malting and brewing processes, steeping, germination, kilning, brewing process: malt, adjuncts, hops, water, yeast, wort boiling, pitching and fermentation, storage and bottling. 8. Explain the physical and thermal properties as well as the uses of gluten proteins. 9. Discuss Rheology, the use of rheological measurements such as extensigraph and alveograph. 10. Describe yeast-leavened products, bread-making systems, dough formation, mixing time, fermentation, moulding, proofing and baking. 11. Explain the uses of soft versus hard wheat flours, chemical leavening, cookies, crackers and biscuits. 12. Discuss the processing of pasta and noodles, the production process, flour for noodles and noodle-making. 13. Describe the processing of breakfast cereals, cereals that require cooking, ready-to-eat cereals, cornflakes, and wheat flakes and puffed cereals. 14. Explain the processing of snack foods such as popcorn, masa and its products, pretzels and bagels.

Course 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, weatabix, 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.

Assessment strategies

Continuous Assessment: 40% (minimum 2 tests, 2 assignments and 5 x marked practicals). Examination: 60% (1 x 2 hr paper).

Course Title:	EDIBLE FATS AND OILS TECHNOLOGY
Code:	AFSC 3802
NQF Level:	8
Notional hours	80
NQF Credits	8
Contact hours	Three lectures per week for 14 weeks;03 hours Practical for every alternate week for 14 weeks.
Prerequisite	AFST 3781: Food Chemistry
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims: This module develops the students understanding involved in lipid chemistry and the processing of oil crops into edible oil and oil products.	

Learning Outcomes: Upon completion of this module, students should be able to: 1. Describe common sources of fats and oils and their composition; 2. Identify oil seeds and fat sources that are common in Namibia and the region; 3. Discuss the composition of oils derived from animals and common oil seeds; 4. Determine the feasibility of exploiting oil on a small scale basis; 5. Determine chemical, physical and functional properties of edible oil. 6. Articulate the common procedures followed in the production of fats and oils based products. 7. Identify common factors that lead to the deterioration of fats. 8. Assess the nutritional quality of fats and oils products.
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Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests,1 assignment and 4 marked practicals) Examination 60% (1 x 2 hour paper)

Course Title: PLANT EQUIPMENT AND MANAGEMENT	
Course Code	FST 3822
NQF Level	8
Notional Hours	80
NQF Credits	8
Contact hours	Two lecture hours per week for 14 weeks; 03hours Practical every alternate week for 14 weeks.

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims This module develops students understanding, skills, and dispositions regarding issues that are cardinal to the efficient operation and management of processing plants.	

Learning Outcomes/Specific Outcomes On completing the course students should be able to: 1. Select site for food processing plant, design layout for equipment and put in place safety design; 2. Process potable and boiler water and treat waste effluent from the plant; 3. Install simple electrical gadgets and safety monitoring including single and three phases for processing; 4. Employ economical use of steam and refrigeration for food processing and preservation; 5. Design and uphold management structure for efficiency and for viable enterprise.

Course 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.

Assessment Strategies:

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

I. B.SC. FISHERIES AND AQUATIC SCIENCES (HONS) [17BSFA]

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

1.1 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	
SMAT 3512	Pre-calculus	5	16	C	
Total credits Semester 2					64
TOTAL CREDITS YEAR 1					136
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
AFAS 3691	Aquatic Ecology	6	12	C	None
AFST 3681	General Microbiology	6	12	C	None
AFAS 3601	Ichthyology I	6	8	C	None
Total Credits Semester 1					68
Year 2 Semester 2					
AAEC 3682	Production Economics	6	12	C	None
AFAS 3682	Introduction to Aquaculture	6	12	C	None
ACSC 3692	Biostatistics	7	12	C	SMAT 3511 Basic Mathematics
AASC 3612	Biochemistry	6	16	C	None
AFAS 3692	Aquatic Chemistry	6	12	C	None
AFAN 3682	Natural Resource Economics	6	12	C	None
Total credits Semester 2					76
TOTAL CREDITS YEAR 2					144
Year 3 Semester 1					
AACA 3701	Field Attachment I	7	8	C	None
AFAP 3781	Physical Oceanography	6	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	AFAS 3602: Ichthyology I and AFAN 3682: Natural Resource Economics
AAEC 3781	Farm Planning and Management	7	12	C	None
Total Credits Semester 1					68
Year 3 Semester 2					
AFAS 3782	Basic Aquaculture Engineering	7	12	C	AFAS 3682: Intro to Aquaculture, AFAS 3692: Aquatic Chemistry, AFAS 3691: Aquatic Ecology and AFAS 3602: Ichthyology I
AFAS 3792	Fisheries Management II	7	12	C	AFAS 3602: Ichthyology I and AFAN 3682: Natural Resource Economics
AFAS 3712	Integrated Coastal Zone Management	7	16	C	AFAS 3691: Aquatic Ecology
AFAA 3782	Aquaculture Nutrition and Feed Manufacturing	7	12	C	None
ACSC 3792	Research Methods	7	12	C	None
Total credits Semester 2					64
TOTAL CREDITS YEAR 3					132
Year 4 Semester 1					
AFAS 3810	Research Project	8	16	C	ACSC 3692: Biostatistics and ACSC 3792: Research Methods
AFAS 3811	Biological Oceanography	8	16	C	AFAS 3781 Physical Oceanography, and FAS 3692 Aquatic Chemistry
AACA 3801	Field Attachment II	8	8	C	None
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, AFAF 3781: Fisheries Management I and AFAF: 3782 Fisheries Management II
Total Credits Semester 1					68
Year 4 Semester 2					
AFAS 3810	Research Project	8	16	C	ACSC 3692: Biostatistics and ACSC 3792: Research

					Methods
AENE 3882	Environmental Impact Assessment	8	12	C	AFAS 3712: Integrated Coastal Zone Management
AFAS 3812	Fish Population Dynamics	8	16	C	ACSC 3692: Biostatistics and 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
Total credits Semester 2					60
TOTAL CREDITS YEAR 4					128
TOTAL CREDITS FOR THE PROGRAMME					540

I.2 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 description: 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.

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
Pre-requisites:	Examination (40%): one three hour examination paper None

Module description: 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:	5
Credits:	8
Prerequisite:	None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership. Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (**100%**), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be worked out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-

communable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title: INTRODUCTION TO BIOLOGY
Code: SBLG 3511
Course Equivalent: Biology 1A
NQF level: 4
Contact hours: 4 lectures/ week for 14 weeks and one 3-hour practical session per week.
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.
Prerequisites: NSSC (Biology C or better)

Module description (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 domain 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 description (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.

H.5.1.6 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 description (Content): Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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.

H.5.1.7 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 description:	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 Description:	This module is designed for students that have insufficient background in chemistry and for non-chemistry majors .It is an introduction to topics in general and organic chemistry, and biochemistry. The following will be covered:

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.

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 than 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSSC (Biology C or better)
Module description (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 Myxiniiformes, Petromyzontiformes, Placoderms, Chondrichthyes, 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 name:	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
Assessment:	Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite:	NSSC Mathematics

Module description (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

Course title: Principles of Microeconomics	
Code:	AAEC 3681
NQF level:	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Notional Hours:	120
NQF Credits:	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered:	1
Course Aims: This course exposes students to basic concepts and principles in microeconomics and provides an essential foundation for higher level agricultural economics courses such as Marketing Production Economics and Farm management.	

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Define basic microeconomics concepts
2. Explain the concept of resource scarcity
3. Explain concept of demand and supply
4. Explain the concept of consumer theory
5. Explain the concept of choice under uncertainty
6. Discuss the concept of theory of the firm
7. Differentiate between the market structures
8. Explain the concept of general equilibrium analysis
9. Explain externalities and public goods

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course title:	Rural Sociology
Code	AAEC 3691
NQF level	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Notional Hours	120
NQF Credits	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course investigates the basic sociological concepts and their application to agricultural progress and rural development	

Learning Outcomes:

At the end of this course the student should be able to:

1. Define basic sociological concepts and theories
2. Analyze the significance of rural sociology to agricultural extension and rural development;
3. Compare rural and urban populations and their causes;
4. Analyze different cultures and measure its significance in society
5. Discuss role of social institutions in agriculture and rural development;
6. Discuss the social structural and origins of inequalities;
7. Analyze issues of rural urban migration and environment;

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course Title: Production Economics

Course Code	AAEC 3682
NQF Level	6
Notional Hours	120
Contact hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs)
NQF Credits	12
Prerequisite	Co-requisite: AAEC 3681: Principles of Microeconomics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
It introduces students to uses of economic principles in the process of decision making for optimal resource allocation and profit maximization in agricultural production	

Learning outcomes:

Upon completion of this Course, students should be able to:

7. Demonstrate an understanding of microeconomic concepts used in agricultural production economics.
8. Determine optimal allocation of resources, and profit maximization.
9. Analyze issues of risk in agriculture and basic production data and
10. Apply appropriate economic tools, concepts to make sound economic decisions.

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hr paper)

Course Title: General Microbiology	
Course Code	AFST 3681
NQF Level	6
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course provides students with basic concepts about the different groups of microorganisms; growing and controlling microorganisms, their effect to plant human and animal health as well as the environment.	

Learning Outcomes:

Upon successful completion of this module, students should be able to:

8. Name known groups of microorganisms and microscopic particles; and describe the diversity of microbial habitats and the factors that affect colonisation of a particular microbial niche by a particular group or subpopulation.
9. Describe methods of prokaryotic taxonomy.
10. Describe the traits used in the classical and numerical taxonomy of prokaryotes.
11. Explain the advantage of the numerical taxonomy over the classical approach.
12. Describe the tools and techniques used under the molecular biology approach.
13. Propagate and identify microorganism through:
14. Aseptic and pure culture techniques
15. Study by visualising microorganisms through microscopy and staining techniques.
16. Appreciate the need and be able to control the growth and survival of microorganisms in the environments and should be able to prepare laboratory media.
17. Describe the different biology and classification systems of fungi, algae, protozoa and viruses different groups of microorganisms..
18. Know important pathogens of plants and animals and how they affect the host.

Course 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.

Assessment Strategies

Continuous Assessment 40% (minimum 2 tests, 2 assignments and 4 practicals). Examination: 60% (1 x 2 hr paper)

Course Title: Genetics	
Course Code	AASC 3681
NQF Level	6
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims To present advanced genetic concepts with particular emphasis on molecular genetics. Examples are used from different species of eukaryotes and prokaryotes.	

Learning outcomes:

Upon successful completion of this module, students should be able to:

1. Explain the modified Mendelian ratio.
2. Discuss the structure, function and variations of chromosomes.
3. Describe the molecular structure of DNA.
4. Discuss the types of mutations, causes and detection methods.
5. Explain the significance of genetic variations.
6. Discuss sex determination in eukaryotic species.
7. Describe the basic aspects of the flow of genetic information from DNA to proteins and self-replication.
8. Explain basic molecular techniques such as DNA extraction, PCR and gene cloning.
9. Describe the applications of genetic engineering in agriculture.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2 assignments, 2 tests and at least 5 marked practicals). Examination: 60% (1 x2 hr paper).

Course Title: Biochemistry	
Course Code	AASC 3612
NQF Level	6
Notional Hours	160
Contact hours:	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr/wk for 14 weeks (42hrs)
NQF Credits	16

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims This course is designed to help students gain key concepts of biochemistry of living cells so as to comprehend life process in both plant and animals.	

Learning outcomes: Upon completion of this course the student should be able to:

- Describe acids, bases, buffers and pH
- Describe the chemical structures and functions of carbohydrates, proteins, lipids, vitamins and coenzymes
- Explain the role of enzymes in biological systems and discuss the factors affecting enzyme activities.
- Describe the concepts of enzyme kinetics, enzyme inhibition and allosterism
- Distinguish between water soluble and fat soluble vitamins and describe the functions of vitamins in animal nutrition
- Discuss catabolic biochemical reactions such as glycolysis, TCA cycle, that take place in living tissues to provide energy in the form of ATP.
- Discuss anabolic biochemical processes such as pentose phosphate pathway and gluconeogenesis
- Describe the glyoxylate cycle in oily seeds
- Describe the more common laboratory tests for determining the presence of sugars, proteins and lipids

Course 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, malonyl 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.

Assessment Strategies

Continuous Assessment: 40% (minimum 2 assignments, 2 tests and at least 5 marked practicals). Examination: 60% (1 x3 hr paper)

Course Title: Aquatic Ecology	
Course Code	AFAS 3691
NQF Level	6
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims The course aim to equip students with application of knowledge in aquatic sciences in monitoring ecological process in the aquatic environment as well as understanding the interactions between aquatic	

animals and their environment.

Learning outcomes: Upon completion of this course the student should be able to:

1. Discuss the aquatic environment and define the ecological boundaries of any aquatic system in order to assess the state of ecological processes in that system.
2. Assess the critical biotic and abiotic factors affecting (directly/indirectly) any aquatic system.
3. To identify the various social structures in an aquatic system and be able to describe keystone species in an aquatic environment to monitor ecological processes.

Course Content:

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. Functional webs. Influence of competition. Predation and symbiosis and commensalisms on community structure. Reproduction tactics, growth, survival and fecundity of producers and consumers.

Assessment Strategies

Continuous Assessment: 40% (minimum 2 assignments, 2 tests and at least 5x marked practicals). Examination: 60% (1 x2 hr paper)

Course Title:	Introduction to Aquaculture
Course Code	AFAS 3682
NQF Level	6
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims The aim of this course is to equip students with the scientific and technical skills required for the operation of an aquaculture venture.	

Learning outcomes: Upon completion of this course the student should be able to:

1. Define the term Aquaculture and its applications to both aquatic fauna and flora.
2. Appraise and recognize the approaches to water re-use in an aquaculture system.
3. Design a protocol for the determination of water quality parameters in various aquaculture systems.
4. Prepare a feasibility report for the establishment of an aquaculture project.
5. Critically assess different scenarios and apply knowledge when designing a new aquaculture venture.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, 1 marked assignment and 3 practicals); Examination: 60% (1 x 2 hr paper)

Course Title:	Ichthyology I
Course Code	AFAS 3601
NQF Level	6
Notional Hours	80
Contact hours	Lectures: 2 x 1hr/wk for 14 weeks (28hrs); Practical's: 1 x 2hr alternate for 14 weeks (14hrs)
NQF Credits	8

Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims The course introduces students to the concepts of fish systematics and identification of major groups of Namibian fish resources.	

Learning outcomes: Upon completion of this course the student should be able to:

1. Identify and classify the different fish resources of the Namibian aquatic environment.
2. Relate the different external features of fish to its identification and classification.
3. Perform detailed morphometric index of any fish species
4. Perform fish scale and fin count
5. Estimate the age of a fish using scale and Otolith.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests and 3 marked assignments); Examination: 60% (1 x 2 hr paper)

Course Title: Aquatic Chemistry	
Course Code	AFAS 3692
NQF Level	6
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims The course introduces the students to the concepts of chemical reactions in the aquatic environment and the interactions between the various chemical constituents in the aquatic ecosystem as well as interactions between the biotic parameters and the nutrient recycling in oceans.	

Learning outcomes: Upon completion of this course the student should be able to:

1. Identify and quantify the major constituents characterizing a water body.
2. Assess the nutrient cycles in a given water body using relevant sampling techniques.
3. Address the interactions between pH, Oxygen, Carbon Dioxide, Ammonia, substance toxicity levels and temperature in a water body.
4. Apply knowledge to assess the chemical reactions taking place in a water body
5. Compare the productivity of the Benguela System to other current systems
6. Demonstrate an understanding of energy flow through marine and estuarine environments

Course 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 gases 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).

Course Title:	BIOSTATISTICS
Course Code	ACSC 3692
NQF Level	6
Notional Hours	120
Contact hours	3 lecture hours / week for 14 weeks; 3 tutorial / practical hours alternate weeks for 14
NQF Credits	12
Prerequisite	SMAT 3511 Basic Mathematics
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module introduces students to concepts of statistics and experimentation. It prepares students to design, execute and analyse experiments and present findings in formats that are understandable to other researchers and the public	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 6. Perform calculations in basic statistics and probability 7. Validate research hypothesis on the basis of statistical inference tools 8. Demonstrate understanding scientific research methodology 9. Design experiments, collect data, analyse and interpret 10. Present statistical data in formats acceptable for scientific writing and public consumption 	

Course 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.

Assessment Strategies

Continuous assessment (40%): at least three assessments; Examination (60%): 1 x 2 hr paper

Course Title:	Natural Resource Economics
Course Code	AFAN 3682
NQF Level	6
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course introduces students to the various concepts of natural resource economics with emphasis on sustainability of renewable and non-renewable resources.	

Learning outcomes: Upon completion of this course the student should be able to:

1. Apply economics to natural resource management
2. Differentiate between contingent valuation, effect on production and surrogate market techniques to the valuation of natural resources
3. Demonstrate an understanding and ability to interpret the concept of discounting and its effect on harvesting and decision making in natural resource use
4. Appreciate the linkage between property rights and harvesting levels of natural resources
5. Differentiate between renewable and non-renewable natural resources

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests and 3 marked assignments); Examination: 60% (1 x 2 hr paper)

Third Year

Course Title:	Physical Oceanography
Course Code	AFAP 3781
NQF Level	7
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	The aim of this course is to equip students with the scientific and technical skills required for the operation of an Oceanographic laboratory, data collection, analysis and interpretation, and scientific reporting. Relate the physics of oceans to the biology of oceans.

Learning outcomes: Upon completion of this course the student should be able to:

1. Appraise and recognize the different forces behind water movement in the world oceans e.g. waves, tides, and winds.
2. Design a protocol for the determination of marine water quality parameters.
3. Capable of using oceanographic instruments.
4. Critically assess different scenarios and apply knowledge when interpreting oceanographic data and report writing.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, 1 assignment and 3 practicals); Examination: 60% (1 x 2 hr paper)

Course Title:	Aquaculture and Fisheries Products
Course Code	AFAS 3781
NQF Level	7
Notional Hours	120
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 3682: Introduction to Aquaculture
Compulsory/Elective	
Semester Offered	1
Course Aims	The course introduces students to the various concepts of fisheries products and customer quality assurance on wild captured and aquaculture produce. This course also aims to educate students on various hazards and customer safety during capture/production of various fisheries products.

Learning outcomes: Upon completion of this course the student should be able to:

1. Differentiate between freshness and quality.
2. Apply apt processing and preservation methods based on customer preferences.
3. Evaluate fish freshness through sensory, chemical, physical and microbial methods.
4. Interpret safety and quality concerns when preparing and preserving fish and other sea foods through various means.
5. Develop a HACCP plan and apply the (7) principles of HACCP as well as pre-requisite programs.
6. Provide advice on how to handle fish properly to maintain good quality and prevent loss due to damage/ spoilage.
7. Provide advice on quality assurance and safety of seafood through the implementation of proper control systems

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 practicals); Examination: 60% (1 x 2 hr paper)

Course Title:	Ichthyology II
Course Code	AFAF 3781
NQF Level	7
Notional Hours	120
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 3682: Introduction to Aquaculture
Compulsory/Elective	
Semester Offered	1
Course Aims The course introduces students to the concepts of fish biology and adaption to the aquatic environment and life strategies.	

Learning outcomes: Upon completion of this course the student should be able to:

1. Describe the internal anatomy of the fish and relate each organ to the functions they perform.
2. Critically analyse the survival strategies use by fish to survive in its natural habitat.
3. Apply the principles of fish physiology in the management of an aquaculture enterprise.
4. Apply knowledge of the natural migration and behaviour of fish to management of fishery resources.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)

Course Title:	Field Attachment I
Course Code	ACA 3701
NQF Level	7
Notional Hours	80
Contact hours	Six weeks of Field Attachment
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims The aim of this course is to expose students to practical know-how in the field under the supervision of a technical expert in the field in order for students to come to terms with technology and limitations under a working environment.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Relate to the working environment in various Fields/industries
2. Re-evaluate their choice of field and make proper decisions on paths to follow
3. Come up with realistic research projects according to their experience in the field.
4. Come to grips with the technology and limitations in the field

Course 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.

Assessment Strategies

40 % report presentation at a seminar; 60 % Field report. Subject to satisfactory attendance and good conduct during attachment.

Course Title: Farm Planning and Management	
Course Code	AAEC 3781
NQF Level	7
Notional Hours	120
NQF Credits	12
Contact Hours	Lectures: 3x 1hr/wk for 14 weeks (42hrs); Practical's: 1 x 3hr alternate wk for 14 weeks (21hrs)
Prerequisite	AAEC 3682: Production Economics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course exposes students to essential functions of management (planning, implementation, and control) and skills which are essential to managing, advising, and/ or servicing farm enterprises and other agribusinesses.	

Learning outcomes:

Upon completion of this Course, students should be able to:

1. Discuss management principles and concepts to apply in managing a farm business successfully.
2. Formulate, compare and appraise farm financing plans.
3. Identify strategies for dealing with risk and uncertainty in the farm business.
4. Apply budgeting techniques and computer skills to analyze farm enterprise budgets and conduct whole farm planning.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)

Course Title: Fisheries Management I	
Course Code	AFAS 3791
NQF Level	7
Notional Hours	120
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	FAS 3602: Ichthyology I, FAN 3682: Natural Resource Economics
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The aim of this course is to provide students with a good theoretical background and understanding of fisheries management issues relevant for its development. To impart and sharing knowledge from other countries regarding fisheries and their management.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Link fisheries development to management
2. Apply co-management concepts to fisheries while understanding its various shortcomings
3. Apply policies on fisheries management
4. Apply fisheries management approach into gender equality, poverty alleviation and sustainable livelihoods issues
5. Discuss rationale for fisheries management
6. Explain lesson learned from other countries with regard to fisheries development and management

Course 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)

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)

Course Title: Fisheries Management II	
Course Code	AFAS 3792
NQF Level	7
Notional Hours	120
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 3602: Ichthyology I, AFAN 3682: Natural Resource Economics
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The aim of this course is to advance students understanding on relevant approaches pertaining to effective management of fisheries resources. Furthermore, to provide students with scientific knowledge necessary for competent fisheries management.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Forecast on future trends of a fishery.
2. Conduct socio-economic baseline surveys to collect fisheries data that can be used in management decision-making
3. Deal with mutually exclusive objectives in fisheries management
4. Demonstrate and understanding of methods and techniques used in managing fishery activities.
5. Explain lessons learned from other countries with regard to fisheries development and management

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper)

Course Title: Integrated Coastal Zone Management	
Course Code	AFAS 3712
NQF Level	7
Notional Hours	160
Contact hours	Lectures: 4x 1hr/wk for 14 weeks (56hrs); Practical's: 1 x 3hr for 14 weeks (42hrs)
NQF Credits	16
Prerequisite	AFAS 3691: Aquatic Ecology
Compulsory/Elective	Compulsory

Semester Offered	1
Course Aims	
The aim of this course is to broaden students' scientific knowledge of the impacts of climate change as well as human interference on the coastal environment.	

Learning Outcomes	
<i>Upon successful completion of this module, students should be able to:</i>	
<ol style="list-style-type: none"> 1. Critique the potential impacts of Climate Change on the coastal environment 2. Interpret anthropogenic interference on coastal environments 3. Justify the different guiding principles in ICZM 4. Demonstrate an understanding of the EIA process as accepted internationally 5. Apply the concepts of Sustainable Development 	

Course content

Potential impacts by climate change and direct human interference on coastal systems. Impact assessment: scoping 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).

Course Title: Basic Aquaculture Engineering	
Course Code	AFAS 3782
NQF Level	7
Notional Hours	120
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 3682: Introduction to Aquaculture, AFAS 3692: Aquatic Chemistry, AFAS 3691: Aquatic Ecology, AFAS 3602: Ichthyology I
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The aim of the course is to provide students with a general overview of the technical engineering knowledge and principles used in aquaculture and biological production systems.	

Learning Outcomes	
<i>Upon successful completion of this module, students should be able to:</i>	
<ol style="list-style-type: none"> 1. Critically diagnose factors to be considered in site selection 2. Know the hydrological information for aquaculture system design, water transport dynamics, materials involved and the types of pumps used in aquaculture 3. Conceptualize water quality management and water treatment 4. Have a basic knowledge of fish Hatchery and live feed system design, recirculating and water re-use systems and raceways, cages and other flow-through systems in aquaculture 5. Express an understanding of the mechanization of fish farm operations 	

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).

Course Title:	Research Methods
Course Code	ACSC 3792
NQF Level	7
Notional Hours	120
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	ACSC 3692: Biostatistics
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course enables the student to carry out statistical analysis of research data using scientific acceptable methods and procedures.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Perform calculations with non-parametric data and make statistical inferences
2. Design experiments, analyse, interpret and present results
3. Design field surveys, collect data, analyse and interpret results
4. Utilise computer software in controlled experiments and field survey data analysis
5. Evaluate critical results of experiments published in journal articles.

Course 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

Assessment Strategies

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

Course Title:	Aquaculture Nutrition and Feed Manufacturing
Course Code	AFAA 3782
NQF Level	7
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The aim of this course is to broaden students' scientific knowledge on the nutritional requirements of fish kept in captivity as well as to equip students with necessary knowledge to formulate and manufacture artificial diets.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Identify potential sources of feed stuffs used in manufacturing diets.
2. Analyze dietary components
3. Analyze digestibility of different feeds
4. Evaluate feed formulation models and least cost production
5. Be able to independently manufacture artificial diets

Course 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.

Assessment Strategies

Continuous Assessment: 40% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 60% (1 x 2 hr paper).

Fourth Year

Course Title:	Research Project
Course Code	AFAS 3810
NQF Level	8
Notional Hours	320
Contact hours	Consultation: 1 x 1hr/wk for 28 weeks (28 hrs)
NQF Credits	32
Prerequisite	ACSC 3692: Biostatistics and ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
The aim of this course is to develop student's skills in initiating and executing a design scientific research in specific area of Fisheries and aquatic Sciences.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Develop a research project proposal.
2. Implement a research project; analyze/interpret data and write up
3. Enhanced communications skills: high quality presentations to a wide audience.
4. Carry out supervised scientific project with maturity and a degree of independence.

Course 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.

Course Title:	Field Attachment II
Course Code	AACA 3801
NQF Level	8
Notional Hours	80
Contact hours	Six weeks of Field Attachment
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The aim of this course is to expose students to practical know-how in the field under the supervision of a technical expert in the field in order for students to come to terms with technology and limitations under a working environment.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Relate to the working environment in various Fields/industries
2. Re-evaluate their choice of field and make proper decisions on paths to follow
3. Come up with realistic research projects according to their experience in the field.
4. Come to grips with the technology and limitations in the field

Course 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)

Course Title: Fisheries Economics	
Course Code	AFAS 3891
NQF Level	8
Notional Hours	120
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, AFAP 3781: Fisheries Management I, AFAP 3792: Fisheries Management II
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims The aim of this course is to equip students with the needed skills in the application of economic principles in fisheries management.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Interpret the role of economics in fisheries management
2. Comprehend the link between harvesting and fish populations.
3. Interpret and analyze scientific fishery models
4. scrutinize the linkage between species interaction and harvesting
5. Appraise economic instruments in regulating levels of fish harvesting.

Course 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).

Course Title: Fish Pathology	
Course Code	FAS 3831
NQF Level	8
Notional Hours	160
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
Course Aims The aim of the course is to provide students with in-depth knowledge and practical tools and skills necessary in the identification, diagnosis and treatment of diseases, parasites and fish in culture situations.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Have an understanding of disease, immune system of fish and general epizootology
2. Describe the causative agents of the major bacterial, viral and parasitic diseases of cultured and wild fishes
3. Differentiate between infectious and non-infectious diseases
4. Confidently recognize and evaluate the major factors that contribute to disease outbreaks in culture and the range of diseases encountered in aquaculture enterprises
5. Be conversant with the tools and techniques available to diagnostic and prophylactic methods to

- many common diseases.
6. Apply theories and principles of fish pathology to new areas and problems in new contexts
 7. Integrate possibilities and limitations of fish pathology in new methodology for solving disease related problems.
 8. Expand the applicability of the methods by including theories and methods also for new, complex and un-predictable situations
 9. Predict health related aspects of fish production systems according to new situations under different abiotic and biotic conditions.
 10. Develop quality and health management programs for aquaculture and fisheries establishments

Course 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, mioxsporidian 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).

Course Title: Environmental Impact Assessment	
Course Code	AENE 3882
NQF Level	8
Notional Hours	120
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
Course Aims	
To familiarize students with the process and techniques of Environmental Impact Assessment required for fulfillment of sustainable environmental development.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Design an Environmental Impact Assessment process into a project plan
2. Apply policies in the context of monitoring and controlling project activities
3. Conduct Environmental Impact Assessment on existing and new projects, prepare EIA reports and recommend mitigation measures
4. Appraise available EIA techniques and methods and determine the best methods for assessing different projects and different prevailing circumstances

Course 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).

Course Title:	Biological Oceanography
Course Code	FAS 3811
NQF Level	8
Notional Hours	160
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
Course Aims	
The aim of this course is to equip students with the scientific and technical skills required for the operation of Biological Oceanography laboratory, data collection, analysis and interpretation, and scientific reporting.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Demonstrate an understanding of what Biological Oceanography entails.
2. Appraise and recognize the different factors that support life in the sea through adaptations, life history traits, foodwebs and foodchains, and other biological interactions.
3. Recognize the role of algae and bacteria in oceans
4. Design a protocol for the determination of both micro and macro biological estimates, and identification.
5. Capable of using oceanographic instruments.
6. Critically assess different scenarios and apply knowledge when interpreting biological samples in relation to corresponding environmental variables.

Course 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).

Course Title:	Fish Population Dynamics
Course Code	AFAS 3812
NQF Level	8
Notional Hours	160
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
Course Aims	
The aim of this course is to equip students with the technological skills required in the fishing industry and the application of population dynamics in the marine environment.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Scrutinize the difference between dependent and independent fishery data.
2. Identify crucial tools that are used in fish stock assessment.
3. Apply analytical and holistic models in fish stock assessment.
4. Design an appropriate sampling programme for a fish survey.
5. Collect and analyze biological data used in fish stock assessment.

Course 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).

Course Title:	Aquaculture Management
Course Code	AFAS 3832
NQF Level	8
Notional Hours	160
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
Course Aims	
This course aims to make students aware of general managerial practices in commercial aquaculture enterprises.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Manage broodstock and hatcheries
2. Apply knowledge in general aquaculture animal health management
3. Prescribe basic hygienic conditions on the farm
4. Maintain good measure and maintain good water quality
5. Demonstrate an understanding human resources, financial and labour skills required for successful aquaculture management

Course 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).

J. B.SC. INTEGRATED ENVIRONMENTAL SCIENCE (HONS) {(Ogongo Campus)} [17BSIE]

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

J.1 PROGRAMME SCHEDULE

Course Title	Course Code	NQF Level	Credits	Compulsory	Elective	Pre-requisite
Year 1						
Computer Literacy	UCLC 3509	5	8	Yes	No	
English Communication and Study Skills	ULCE 3419	4	16	Yes	No	
Contemporary Social Issues	UCSI 3580	5	16	Yes	No	
Introduction to Biology	SBLG 3511	4	16	Yes	No	
Basic Mathematics	SMAT 3511	5	16	Yes	No	
English for Academic Purposes	ULEA 3519	5	16	Yes	No	
Chemistry for Life Sciences	SCHM 3532	5	16	Yes	No	
Diversity of Life	SBLG 3512	5	16	Yes	No	
Pre-calculus	SMAT 3512	5	16	Yes	No	
Credits Year 1			136			
Year 2						
Principles of Microeconomics	AAEC 3681	6	12	Yes	No	
Rural Sociology	AAEC 3691	6	12	Yes	No	None
Genetics	AASC 3681	6	12	Yes	No	None
Ecology	AIES 3681	6	12	Yes	No	None
Environmental Science	AIES 3691	6	12	Yes	No	None
General Microbiology	AFST 3681	6	12	Yes	No	None
Principles of Macroeconomics	AAEC 3692	6	12	Yes	No	None
Biochemistry	AASC 3612	6	16	Yes	No	CHM 3532 (Chemistry for Life Sciences)
Plant Physiology	AIES 3682	6	12	Yes	No	None
Soil Science for Crop Production	ACSS 3681	6	12	Yes	No	None
Climatology and Hydrology	AIES 3622	6	8	Yes	No	None
Natural Resource Economics	AFAN 3682	6	12	Yes	No	None
Biostatistics	ACSC 3692	6	12	Yes	No	None
Credits Year 2			156			
Year 3						
Field Attachment I*	AACA 3701	7	8	Yes	No	None
Dryland Plants	AIED 3781	7	12	Yes	No	None
Principles of Wildlife Management	AIEP 3781	7	12	Yes	No	None
Geo-informatics	AIES 3791	7	12	Yes	No	None
Agroforestry	AIEA 3781	7	12	Yes	No	None
Nature Conservation	AIEN 3792	7	12	Yes	No	None
Natural Resource Governance	AIEN3782	7	12	Yes	No	None
Community Based Resource Mgt.	AIES 3702	7	8	Yes	No	None
Research Methods	ACSC 3792	7	12	Yes	No	CSC 3692 (Biostatistics)
Agricultural Extension	AAEC 3712	7	16	Yes	No	AAEC 3791 (Rural Sociology)
Credits Year 3			126			None
Year 4						
Forestry Option						
Field Attachment II*	AACA 3801	8	8	Yes	No	ACA 3701 (Field Attachment I)

Course Title	Course Code	NQF Level	Credits	Compulsory	Elective	Pre-requisite
Research Project (Forestry)	AFOR 3810	8	32	Yes	No	ACSC 3792 (Research Methods)
Silviculture	AFOR 3881	8	12	Yes	No	AIES 3681(Ecology) and AIES 3682 (Plant Physiology)
Forest Protection	AFOR 3891	8	12	Yes	No	None
Forest Mensuration	AFOF 3881	8	12	Yes	No	None
Forest Inventory	FOR 3882	8	12	Yes	No	None
Forest Economics & Marketing	AFOR 3812	8	16	Yes	No	None
Forest Management	AFOR 3892	8	12	Yes	No	None
Project Planning and Management	AAEC 3881	8	12	Yes	No	None
Credits Year 4			126			
Total Credits			544			
Environmental Science Option						
Field Attachment II	AACA 3801	8	8	Yes	No	ACA 3701 (Field Attachment I)
Research Project (Environmental Science)	AENV 3810	8	32	Yes	No	ACSC 3792 (Research Methods)
Environment & Development	AENV 3881	8	12	Yes	No	None
Environmental Pollution Control	AENV 3891	8	12	Yes	No	None
Watershed Management	AENV 3801	8	8	Yes	No	None
Project Planning and Management	AAEC 3881	8	12	Yes	No	AAEC 3691 (Principles of Microeconomics)
Management of Arid and Semi-Arid Lands	AENV 3882	8	12	Yes	No	None
Environmental Planning and Management	AENP 3882	8	12	Yes	No	None
Environmental Impact Assessment	AENE 3882	8	12	Yes	No	AIES 3782 (Natural Resource Governance)
Environmental Education	AENE 3892	8	12	Yes	No	None
Credits Year 4			130			
Total Credits			548			

J.2 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 description: 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.

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 description: 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:	5
Credits:	8
Prerequisite:	None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership.

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability,

Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.

- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,
- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,

- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (100%), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title: INTRODUCTION TO BIOLOGY
Code: SBLG 3511
Course Equivalent: Biology 1A
NQF level: 4
Contact hours: 4 lectures/ week for 14 weeks and one 3-hour practical session per week.
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.
Prerequisites: NSCC (Biology C or better)

Module description (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 domain 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.

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: NSCC Mathematics

Module description (Content): Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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 description: 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 Description:

This module is designed for students that have insufficient background in chemistry and for non-chemistry majors. It is an introduction to topics in general and organic chemistry, and biochemistry. The following will be covered:

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.

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 than 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)

Prerequisites: NSCC (Biology C or better)

Module description (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 Myxiniiformes, Petromyzontiformes, Placoderms, Chondrichthyes, 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 name: 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
Assessment: Continuous assessment 50% (at least 3 tests), examination 50% (3 hours examination paper).
Prerequisite: NSSC Mathematics

Module description (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

Course title: Principles of Microeconomics	
Code:	AAEC 3681
NQF level:	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Notional Hours:	120
NQF Credits:	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered:	1

Course Aims:

This course exposes students to basic concepts and principles in microeconomics and provides an essential foundation for higher level agricultural economics courses such as Marketing Production Economics and Farm management.

Learning outcomes:

Upon completion of this course, the student should be able to:

1. Define basic microeconomics concepts
2. Explain the concept of resource scarcity
3. Explain concept of demand and supply
4. Explain the concept of consumer theory
5. Explain the concept of choice under uncertainty
6. Discuss the concept of theory of the firm
7. Differentiate between the market structures
8. Explain the concept of general equilibrium analysis
9. Explain externalities and public goods

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course title: Principles of Macroeconomics	
Code:	AAEC 3682
NQF level:	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Notional Hours:	120
NQF Credits:	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered:	2
Course Aims:	
The course introduces the students to basics concepts in macroeconomics and functioning of the economy in aggregate	

Learning outcomes:

Upon completion of this course, the student should be able to:

- Define macroeconomics concepts;
- Describe several macroeconomic variables;
- Explain the national accounting models;
- Explain the concept of aggregate demand and aggregate supply (IS and LM curves)
- Use macroeconomic theory to predict the movements of the key economic indicators;
- Evaluate the effectiveness of macroeconomic policy (fiscal and monetary policy)

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course title: Rural Sociology	
Code	AAEC 3691
NQF level	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Notional Hours	120
NQF Credits	12
Prerequisites:	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course investigates the basic sociological concepts and their application to agricultural progress and rural development	

Learning Outcomes:

At the end of this course the student should be able to:

8. Define basic sociological concepts and theories
9. Analyze the significance of rural sociology to agricultural extension and rural development;
10. Compare rural and urban populations and their causes;
11. Analyze different cultures and measure its significance in society
12. Discuss role of social institutions in agriculture and rural development;
13. Discuss the social structural and origins of inequalities;
14. Analyze issues of rural urban migration and environment;

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 2 hour paper)

Course title	Genetics
Code	AASC 3681
NQF level	6
Contact hours	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Practical alternate wk for 14 weeks (21hrs)
Notional hours	120
NQF Credits	12
Prerequisites	None
Compulsory/Elective	Compulsory
Semester offered	1
Course Aims	
To present advanced genetic concepts with particular emphasis on molecular genetics. Examples are used from different species of eukaryotes and prokaryotes.	

Learning Outcomes:

Upon successful completion of this module, students should be able to:

- Explain the modified Mendelian ratio.
- Discuss the structure, function and variations of chromosomes.
- Describe the molecular structure of DNA.
- Discuss the types of mutations, causes and detection methods.
- Explain the significance of genetic variations.
- Discuss sex determination in eukaryotic species.
- Describe the basic aspects of the flow of genetic information from DNA to proteins and self-replication.
- Explain basic molecular techniques such as DNA extraction, PCR and gene cloning.
- Describe the applications of genetic engineering in agriculture.

Course 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.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals).

Exam: 60% (1 x 2 hr paper).

COURSE TITLE		ECOLOGY
Code		AIES 3681
NQF level		6
Contact hours		Lectures: 3 x 1hr/wk for 14 weeks (42 hrs); Practicals: 1 x 3 hrs alternate for 14 weeks (21hrs)
Notional hours		120
NQF Credits		12
Prerequisites		None
Compulsory/Elective		Compulsory
Semester offered		1
Course Aims		
To present advanced genetic concepts with particular emphasis on molecular genetics. Examples are used from different species of eukaryotes and prokaryotes.		

Learning outcomes:

Upon completion of the course, students should be able to:

- Identify the key components of an ecosystem and demonstrate how the components relate to each other.
- Outline abiotic and biotic factors that influence plant and animal adaptations, distributions and abundances
- Compare the structure, composition, diversity and conservation significance of different plant and animal communities
- Apply succession models to analyze successional status of a given landscape

Course content

Ecological concepts. Physical, chemical and biological parameters of the environment. Population characteristics; Sex ratio, age distribution, growth rate, Population processes, growth models; density dependent and independent population regulation. Estimating population size, life-table analysis, survivorship. Ecosystem processes: Trophic levels, Biomass, Nutrient cycling. Community ecology: Classification of communities (biogeoclimatic classification applied to Namibia), Diversity and its measurements. Conservation guilds (keystone, flagship and umbrella species). Habitat utilization. Dynamics (ecological succession) and stability.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3hr paper)

COURSE TITLE		ENVIRONMENTAL SCIENCE
Code		AIES 3691
NQF level		6
Contact hours		Lectures: 3 x 1hr/wk for 14 weeks (42 hrs); Practicals: 1 x 3 hrs alternate for 14 weeks (21hrs)
Notional Hours		120
NQF Credits		12
Prerequisites		None
Compulsory/Elective		Compulsory
Semester Offered		1
Course Aims		
The course introduces students to concepts of environment, natural resource, demography and land use. Major environmental concerns including pollution to soils and water, desertification, soil degradation, urbanization and waste management are also given attention.		

Learning outcomes:

Upon completion of this course, the students should be able to:

- Recognize that most environmental problems are a result of human interactions with natural resources
- Differentiate between the various aspects of the environment (social, economic, historical, political, physical and biological issues, amongst others) and how they interact to form a holistic view/ approach to dealing with environmental concerns.
- Diagnose causes of specific environmental problems (e.g. desertification, pollution, soil degradation etc) in Namibia and recommend mitigations
- Evaluate resource management practices within the context of sound environmental management.

Course content

The concepts of; environment, natural resources, demography and land use. Major environmental concerns including pollution, soil erosion and degradation in crop and livestock production systems (Namibian context). Effects of agrochemicals, desertification and methods of control, natural and man-made hazards. Effects of; human population growth, industrialization and urbanization on the environment. Energy sources and their environmental impacts. Waste management. Climate change and the environment.

Assessment Strategies

Continuous assessment 40% (At least three assessments) Examination 60% (1 x 3 hour paper)

Course Title: General Microbiology	
Course Code	AFST 3681
NQF Level	6
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42 hrs): Practicals: 1 x 3 hrs alternate for 14 weeks (21hrs)
Notional Hours	80
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
The course provides students with basic concepts about the different groups of microorganisms; growing and controlling microorganisms, their effect to plant human and animal health as well as the environment.	

Learning Outcomes:

Upon successful completion of this module, students should be able to:

- Name known groups of microorganisms and microscopic particles; and describe the diversity of microbial habitats and the factors that affect colonisation of a particular microbial niche by a particular group or subpopulation.
- Describe methods of prokaryotic taxonomy.
- Describe the traits used in the classical and numerical taxonomy of prokaryotes.
- Explain the advantage of the numerical taxonomy over the classical approach.
- Describe the tools and techniques used under the molecular biology approach.
- Propagate and identify microorganism through:
 - Aseptic and pure culture techniques
 - Study by visualising microorganisms through microscopy and staining techniques.
- Appreciate the need and be able to control the growth and survival of microorganisms in the environments and should be able to prepare laboratory media.
- 10. Describe the different biology and classification systems of fungi, algae, protozoa and viruses different groups of microorganisms..
- Know important pathogens of plants and animals and how they affect the host.

Course 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.

Assessment Strategies

Continuous Assessment 40% (minimum 2 tests, 2 assignments and 4 practicals). Examination: 60% (1 x 3 hr paper)

Course Title: Biochemistry	
Course Code	AASC 3612
NQF Level	6
Contact hours	Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Notional Hours	160
NQF Credits	16
Prerequisite	Chemistry for Life Sciences (CHM 3532)
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course is designed to help students gain key concepts of biochemistry of living cells so as to comprehend life process in both plant and animals.	

Learning outcomes: Upon completion of this course the student should be able to:

- Describe acids, bases, buffers and P^H
- Describe the chemical structures and functions of carbohydrates, proteins, lipids, vitamins and coenzymes
- List essential amino acids and explain why they are essential
- Explain the role of enzymes in biological systems and discuss the factors affecting enzyme activities.
- Describe the concepts of enzyme kinetics, enzyme inhibition and allosterism
- Distinguish between water soluble and fat soluble vitamins and describe the functions of vitamins in animal nutrition
- Discuss how living organisms acquire energy in the form of ATP
- Discuss catabolic biochemical reactions such as glycolysis, TCA cycle, that take place in living tissues to provide energy in the form of ATP.
- Discuss anabolic biochemical processes such as pentose phosphate pathway and gluconeogenesis
- Discuss photosynthesis and its significance.
- Describe the glyoxylate cycle in oily seeds
- Describe the more common laboratory tests for determining the presence of sugars, proteins and lipids.

Course Content

Under this course the students will learn about Physical biochemistry including acids, bases, buffers and pH; Structural biochemistry - learning about the Structure and function of carbohydrates, proteins and lipids. Bioenergetics and Thermodynamics (Free energy, Laws of energy, Endergonic and exergonic reactions); Enzymology (Enzymes as organic catalysts Enzyme nomenclature Enzyme kinetics Factors affecting activities of enzymes The Michaelis-Menten equation The Lineweaver-Burk plot Enzyme inhibition Competitive inhibition Non competitive inhibition Enzyme activity regulation Allosterism Cofactors); Vitamins and coenzymes (Water-soluble vitamins Fat-soluble vitamins); Metabolism (Anabolism and catabolism overview Carbohydrate catabolism Glycolysis Alcohol and lactic acid fermentation Cori cycle Gluconeogenesis Synthesis of the disaccharides lactose and sucrose Synthesis of polysaccharides starch and glycogen Regulation of carbohydrate metabolism Metabolic disorders in carbohydrate metabolism Pentose phosphate pathway Tricarboxylic acid cycle Glyoxylate cycle in oily seeds Photosynthesis Electron transport system and oxidative phosphorylation Fat metabolism Integration of carbohydrate and fat metabolism); Electrophoresis.

Assessment Strategies

Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals). Exam: 60% (1 x 3 hr paper)

COURSE TITLE CLIMATOLOGY AND HYDROLOGY	
Code	AIES 3622
NQF level	6
Contact hours	Lectures: 2x 1hr/wk for 14 weeks (28hrs); Practicals: 1 x 3hr alternate wk for 14 weeks (21hrs)
Notional Hours	80

NQF Credits	8
Prerequisites	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This course introduces students to basic scientific concepts in climatology and hydrology with the aim of creating awareness and understanding of the different elements, factors and processes behind weather changes, climatic classifications and hydrologic parameters which influence man's activities and their importance in water resources utilization and management.	

Learning outcomes:

Upon completion of this course, the students should be able to:

- Demonstrate an understanding of basic concepts of weather and weather forecasting, climate and classification of climates and hydrology
- Illustrate the hydrological cycle showing the interrelationships between the different components
- Describe basic techniques of measuring or estimating weather and hydrological parameters
- Demonstrate an in-depth understanding of factors that influence Namibia's weather conditions and their dynamism
- Differentiate the different types of ground water and evaluate their potential for development and utilization

Course content

Introduction to Climatology concepts; weather, meteorology, climate, climatology and atmosphere. Weather systems and weather forecasting; weather parameters, world weather systems, Namibia weather conditions, weather forecasting. Climate; climatic data, climatic classifications, climatic zones of the world, climatic zones of Namibia, Climate change. Hydrology; parameters and their measurement. Hydrologic cycle; elements and their estimation. Groundwater hydrology-aquifers, water table and aquifer recharge.

Assessment Strategies

Continuous Assessment: 40% (At least three assessments); Examination: 60% (1 x 2 hr paper)

Course title:	Natural Resource Economics
Code	AFAS 3682
NQF level	6
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 3hr alternate wk for 14 weeks (21hrs)
Notional Hours	120
NQF Credits	12
Prerequisites	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course introduces students to the various concepts of natural resource economics with emphasis on sustainability of renewable and non-renewable resources.	

Learning outcomes:

Upon completion of this course, the students be able to:

- Understand the role of economics in natural resource management
- Differentiate between contingent valuation, effect on production and surrogate market techniques to the valuation of natural resources
- Understand discounting and its effect on harvesting decision making in natural resource use
- Appreciate the linkage between property rights and harvesting levels of natural resources
- Differentiate between renewable and non-renewable natural resources

Course 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. Brundtlandreport. Market failures: public goods, externalities. Valuing natural resources: surrogate market techniques, travel time, contingency valuation methods, non-use values; opportunity costs.

Assessment Strategies

Continuous Assessment: 40% (at least three assessments); Examination: 60% (1 x 3 hr paper)

COURSE TITLE	
PLANT PHYSIOLOGY	
Code	AIES 3682
NQF level	6
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42 hrs); Practicals: 1 x 3 hrs alternate for 14 weeks (21hrs)
Notional Hours	120
NQF Credits	12
Prerequisites	None
Compulsory/Elective	Compulsory
Semester offered	2
Course Aims	
To enhance the students understanding on functioning of plants with emphasis on water and nutrient requirements, transport systems and regulation of growth.	
Learning outcomes:	
Upon completion of the course, students should be able to:	
<ul style="list-style-type: none"> ▪ Differentiate between C3, C4 and CAM plants with respect with the way they function ▪ Demonstrate basic understanding of plant physiological processes like respiration, photosynthesis, transport systems and regulation of growth ▪ Describe simple experiments that demonstrate plant physiological processes like osmosis, photosynthesis, respiration etc. ▪ Differentiate between various plant strategies to cope with stresses related to herbivory, nutrient deficiency and drought 	

Course content

Growth and development in plants; development of plant organs, growth hormones, flowering physiology, seed physiology and dormancy. Photosynthesis. Respiration. Plant water relations. Mineral absorption and utilization. Factors affecting plant growth and distribution. Stress physiology.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course Title:	
SOIL SCIENCE FOR CROP PRODUCTION	
Course Code	ACSS 3681
NQF Level	6
Notional Hours	120
Contact hours	03 Lecture hours / week for 14 weeks; 02 Practical hours / week for 14 weeks
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module aims to develop the student's understanding of soil as a medium for plant growth. Concepts covered enhance understanding of soil, land and crop management strategies	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 1. Describe the process of soil formation to appreciate the soil as a triphasic system 2. Recognize and identify different soil texture 	

3. Describe the basic interaction of soil fertility and plant nutrition
4. Employ soil sampling methods
5. Describe soil water and plant relationships

Course 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

Assessment Strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

COURSE TITLE: DRYLAND PLANTS	
Code	AIED 3781
NQF level	7
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42 hrs); Practicals: 1 x 3 hr alternate for 14 weeks (21hrs)
Notional Hours	120
NQF Credits	12
Prerequisites	None
Compulsory/Elective	Compulsory
Semester offered	1
Course Aims	
The course aims at introducing students to the theory and practice of plant taxonomy and to carry out a survey of plants growing in Namibia emphasizing on their taxonomy, botanical characteristics and uses in Namibia and the SADC region.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate an understanding of plant taxonomy concepts, principles and plant collection and preservation techniques
- Demonstrate vast knowledge of grasses, shrubs and trees found in Namibia and their taxonomy, key botanical features and uses in Namibia and the SADC region
- Search and access data bases to retrieve information on origin, taxonomy and uses of different plants among cultures in Namibia and the SADC region
- Design strategies for promoting harvesting of plant products from cultivated plants or from plants in the wild, processing and marketing of the products

Course content

Introduction to plant taxonomy; scope of plant taxonomy, classification, nomenclature, identification and herbarium practice. Taxonomy, botanical characteristics and ecology of key exotic and indigenous plant species in Namibia including; timber and fuel-wood plants, fruit and food plants, fodder plants and medicinal plants (emphasis on grasses, shrubs and trees). Non-woody woodland products. Forest product development.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

COURSE TITLE: PRINCIPLES OF WILDLIFE MANAGEMENT	
Code	AIEP 3781
NQF level	7
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 3hrs alternate for 14 weeks (21hrs)
Notional Hours	120
NQF Credits	12
Prerequisites	None
Compulsory/Elective	Compulsory
Semester offered	1

Course Aims

This course is designed to give students a broad understanding of principles and practices of wildlife management with emphasis to practices in the Southern African Development Community (SADC) countries. This course also aims to develop the students' understanding, skills and attitudes regarding habitat (ranch) management, concept of the carrying capacity and determination of carrying capacity of Namibian range types.

Learning outcomes:

Upon completion of the course, students should be able to:

- Recognize the value of wildlife to human existence.
- Analyze the influence of biophysical and human factors in shaping wildlife populations
- Demonstrate the ability to estimate wildlife numbers using laid down standard scientific methods and procedures, and to assess range conditions, initiate and utilize range condition monitoring practices in routine range management and evaluate range management practices
- Apply various range improvement techniques like fodder diversification and introduction of cultivated pasture appropriately under diverse range conditions and circumstances

Course content

An introduction to basic principles used in the management of wildlife populations, their habitats and their human users. General concepts in: ecological processes; population dynamics and structure; sampling in wildlife; life history patterns, biotic and abiotic factors structuring wildlife populations and endangered species. Home range and territoriality; coloniality; mating systems; hierarchy. Response of wildlife to humans. Plant-herbivore system. Herbivore-carnivore system. Predation of domestic animals by wild animals. Nutritional ecology (anatomy and physiology; feeding ecology; diet composition and analysis; nutritional value of plants; plant chemicals and toxins; management of toxic plants and affected game; grazing and browsing capacity; mineral deficiencies and supplementary feeding; nutrition in captivity). Animals and their characteristics. Management techniques of wildlife. Ranch (habitat) management. Genetic management. Wildlife management and rural development.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course Title: Field Attachment I	
Course Code	AACA 3701
NQF Level	7
Contact hours	Six weeks of Field Attachment
Notional Hours	60
NQF Credits	6
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
The aim of this course is to expose students to practical know-how in the field under the supervision of a technical expert in order for students to come to terms with technology and limitations under a working environment.	

Learning outcomes

Upon completion of the course, students should be able to:

- Apply theoretical knowledge to analyse situations and execute appropriate actions in a work environment relevant to their training
- Conduct administrative duties at the office including permit issue, report writing, budgeting and planning, under supervision
- Display some degree of teamwork and leadership abilities
- Identify researchable field problems and areas of specialization in their field of study
- Appraise operations of their institution of attachment and other related institutions and present findings

Course content

Six weeks of field attachment; at the end of the second year, students will be attached to industries and institutions dealing with environmental/natural resource management selected to ensure that the objectives of on-site training

are attained. An attachment report and oral presentation will constitute the total assessment mark. Students will be visited during their attachment on-site to check on the efficiency of attachment.

Assessment strategies: 50 % report presentation at a seminar; 50 % Field report. Subject to satisfactory attendance and good conduct during attachment.

Course title:	Agroforestry
Code	AIEA 3781
NQF level	7
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 3hrs alternate for 14 weeks (21hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
To introduce students to the different agroforestry systems and technologies used for sustainable land use and the ecological-economic interactions in agroforestry.	

Learning outcomes

Upon completion of this course students should be able to:

- Demonstrate an understanding of agroforestry as a land use option
- Diagnose land management problems and design agroforestry interventions appropriately
- Appraise appropriateness of agroforestry projects in addressing environmental, food security, poverty and other socio-economic problems
- Initiate and manage agroforestry projects with minimum supervision
- Conduct guided or unguided research on an agroforestry topic and disseminate findings to an audience

Course Content

Introduction to agroforestry; definition and principles of agroforestry, integrated land-use system, need for agroforestry, causes and consequences of deforestation. Land-use systems and possible agroforestry intervention. Multi-purpose tree species and their uses. Agroforestry systems and practices including apiculture. Agroforestry demonstration plots. Ecological and economic interactions. Agroforestry development in Namibia and the SADC region – case studies.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course Title:	BIOSTATISTICS
Course Code	ACSC 3692
NQF Level	
Notional Hours	120
Contact hours	3 lecture hours / week for 14 weeks; 3 tutorial / practical hours alternate weeks for 14
NQF Credits	12
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1
Course Aims	
This module introduces students to concepts of statistics and experimentation. It prepares students to design, execute and analyse experiments and present findings in formats that are understandable to other researchers and the public	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
<ol style="list-style-type: none"> 11. Perform calculations in basic statistics and probability 12. Validate research hypothesis on the basis of statistical inference tools 13. Demonstrate understanding scientific research methodology 14. Design experiments, collect data, analyse and interpret 15. Present statistical data in formats acceptable for scientific writing and public consumption 	

Course 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.

Assessment Strategies

Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 02 hour examination paper

Course title:	Nature Conservation
Code	AIEN 3792
NQF level	7
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42 hrs); Practicals: 1 x 3 hr/wk alternate for 14 weeks (21 hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
The course is designed to give students basic knowledge on threats to species and their habitats, and to introduce main concepts and methods of nature conservation. This course also aims to familiarize students with the process and techniques of Environmental Impact Assessment required for fulfillment of sustainable environmental development.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate knowledge of aims and purposes of nature conservation
- Identify and valorize areas for nature conservation
- Apply various methods in nature conservation
- Design an Environmental Impact Assessment process into a project plan
- Conduct Environmental Impact Assessment on existing and new projects, prepare EIA reports and recommend mitigation measures

Course content

Concepts of nature conservation. Values and ethics of conservation. Species conservation. Extinction and Endangered Species. Key and Charismatic Species. Conservation Strategies. Conservation and Sustainable Development. Genetic conservation. Introductions and re-introductions. Nature Conservation in Urbanized and

Agricultural Ecosystems.Environmental Impact Assessment (environmental impact of human activities on natural resources; environmental consideration in physical planning; impact identification, monitoring and mitigation; formal environmental assessment).Environmental Education. The economics of conservation.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Geo-informatics
Code	AIES 3791
NQF level	7
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
To introduce students to the use of GIS and remote sensing programs in monitoring and management of natural resource populations and habitats as well as in solving problems related to management of natural resources	

Learning outcomes:

Upon completion of the course, students should be able to:

- Define the role of Geographic Information Systems (GIS) and Remote sensing in natural resource management
- Describe different GIS data formats, and their use and application to various GIS applications and identify appropriate processing and analysis techniques to solve specific GIS related problems
- Use GIS software to assist with a decision making process; examine and interpret aerial photographs and satellite images, capture data using a hand-held GPS receiver, and build spatial datasets
- Appreciate the uses and limitations of GIS and Remote sensing for natural resource management and value the importance of high quality digital spatial data in natural resource management

Course Content:

Basic concepts, GIS data structures, processing and analysis techniques, basic cartography, map projections, introduction to GPS, basic aerial photograph interpretation. Use of GIS software. Use of GPS receiver. Display and manipulation of image files. Remote sensing for land use/land cover identification and vegetation monitoring.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

NQF level	7
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
To introduce students to the process of formulating national and international environmental policy, laws and conventions and their application in management of natural resources in Namibia	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate knowledge of natural resources laws, statutes and policies in Namibia
- Identify the different policy alternatives applicable for natural resource governance and the way they shape people's behavior toward management of natural resources
- Examine and understand how environmental policies are created and upheld through institutions
- Understand the basic foundations of international law (*history, sources, relevance*) and its implication to the development of Namibia environmental policy and law.
- Evaluate progress made by Namibia in implementing UNCBD, UNFCCC, UNCCD, CITES and Ramsar Convention.

Course content

Principles of law with particular reference to environment, forestry and wildlife resources. Legal process governing environment and industrial pollution. Specific environmental acts and statutes dealing with environment, forestry and wildlife. Introduction to International environmental law and International Conventions; Policies: design, implementation, evaluation of policy impacts. Law enforcement in management of natural resources

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Community-based Natural Resource Management
Code	AIES 3702
NQF level	7
Contact hours	Lectures: 2 x 1hr/wk for 14 weeks (28hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	80
NQF Credits	8
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
The course enhances the students understanding of community based natural resource management systems including institutional arrangements, conflict resolution, participatory resource monitoring and management of common resources	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate a broad but deep understanding of rural livelihoods, community based natural resources management's institutions, power, responsibility and benefit sharing arrangements and challenges involved
- Apply appropriate skills to monitor health and exploitation of a variety of natural resources under community based natural resource management arrangements
- Analyze simple natural resource management conflicts and recommend solutions
- Conduct evaluation of community based natural resource projects using existing or self generated data or information

Course content

Rural development and livelihoods: concepts and principles. Principles of devolution, proprietorship, incentives, authority and responsibility over natural resources. Rural livelihood strategies. Local institutions for CBNRM; community forestry and conservancies: definition and approaches, aims and objectives, history, policy and strategies relevant to community forestry and conservancies. Technical and management alternatives to integrated forest management. Case studies on community forestry and conservancies. The role of governance, participation, communication and community capacity building on CBNRM. Natural resources monitoring and adaptive utilization. Enterprise development and benefit sharing. Management of conflicts over natural resources. Indigenous knowledge on conservation of natural resources

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 2 hr paper)

Course Title: Agricultural Extension	
Course Code	AAEC 3712
NQF Level	7
Contact hours	Lectures: 4 x 1hrL/W for 14 weeks (56hrs); Practicals: 1 x 1hr Prac/W for 14 weeks(14 hrs)
Notional Hours	160
NQF Credits	16
Prerequisite	AAEC 3691 Rural Sociology
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
The course exposes students to concepts of extension, principles and theories of extension, their role and application in agricultural extension and sustainable agricultural development.	

Learning outcomes:

Upon completion of this Course, students should be able to:

- Explain the extension concepts, principles, philosophies and origins of agriculture extension.
- Assess and evaluate the need for extension and its role in sustainable agricultural development.
- Analyze the various methods and approaches to agricultural extension
- Identify workable and effective extension strategies.
- Understanding the elements of diffusion and innovations
- Design effective participatory extension services
- Plan and implement an extension activity/service

Course 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.

Assessment Strategies

Continuous assessment 40% (minimum 2 tests and 1 assignment) Examination 60% (1 x 3 hour paper)

Course Title:	RESEARCH METHODS
Course Code	ACSC 3792
NQF Level	7
Notional Hours	120
Contact hours	03 lecture hours / week for 14 weeks; 3 tutorial hours / practical hours alternate weeks for 14 weeks
NQF Credits	12
Co-requisite	ACSC 3692: BIOSTATISTICS
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This module further develops the student's understanding of research concepts that were not covered in Biostatistics and to design, execute, analyse and present research findings.	
Learning Outcomes/Specific Outcomes	
Upon completion of this course, the student should be able to:	
6. Perform calculations with non-parametric data and make statistical inferences	
7. Design experiments, analyse, interpret and present results	
8. Design field surveys, collect data, analyse and interpret results	
9. Utilise computer software in controlled experiments and field survey data analysis	
10. Evaluate critical results of experiments published in journal articles	

Course 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

Assessment strategies

Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 02 hours paper)

FOURTH YEAR COURSES: FORESTRY SPECIALISATION

Course title:	Research Project (Forestry)
Code	AFOR 3810
NQF level	8
Contact hours	Consultation: 1 x 1hr/wk for 28 weeks (28 hrs)
Notional Hours	320
NQF Credits	32
Pre requisite	ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester offered	1 and 2
Course aims	
To equip students with skills needed to carry out independent research in the field of forestry including planning, designing, methodology, data analysis and result interpretation, discussion and dissemination of findings.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Identify researchable problems and develop research project proposal with minimum assistance
- Implement a research project; analyze data statistically, interpret results and write up, independently or with little supervision
- Demonstrate ability to make high quality presentations to a wide audience using well formulated arguments to express and support research findings

Course content

Senior undergraduate 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% (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).

Course title:	Silviculture
Code	AFOR 3881
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	AIES 3681: Ecology; AIES 3682: Plant Physiology
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
Equip students with knowledge and skills required for cultivation of trees from seedling to a mature tree for a specific purpose and scientific management of forest ecosystems	

Learning outcomes:

Upon completion of the course, students should be able to:

- Apply ecosystem approach to the utilization and management of forest resources, maintaining essential ecological processes
- Apply silvicultural practices and skills to enhance the health of forest ecosystems including maintenance of biodiversity and health soil conditions
- Design forest management strategies that utilize fundamental principles of tree ecophysiology and husbandry as the basis for silvicultural prescriptions
- Evaluate and recommend silvicultural systems from the stand point of the end products required, socio-economic and ecological factors

Course content

Definitions and relations with other disciplines. Forest stand dynamics.. Forest plantations: plantation forestry in Southern Africa: justification and historical perspective. Planning of plantation: site selection, choice of species and provenances. Nursery practice. Seed collection, processing, storage and treatment. Forest establishment: site preparation, establishment methods: natural regeneration, coppicing, planting – direct seeding and transplanting. Forest tree maintenance: post planting problems, fertilization, irrigation, weed control, protection, pruning and thinning. Applicable silvicultural systems. Silviculture of selected indigenous and exotic species. Theory and practice of tree improvements

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Forest Protection
Code	AFOR 3891
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	To introduce students to the common diseases, infections and insects affecting plants of economic importance in Namibia and equip them with skills to identify best strategies for their control. Management of forest fires is also covered

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate a deep understanding of infection, establishment, spread and control of common forest diseases and pests in Namibia and the southern Africa region
- Detect, investigate and quantify seriousness of disease and pest outbreaks and recommend immediate control measures
- Equip, train, mobilize and coordinate fire control teams in fighting less serious forest fires

Course content

The concept of disease, biotic and abiotic causes of plant diseases: Introduction to plant pathogenic organisms with special reference to forest pathogens; Principles of plant infection, disease establishment and spread; Major plant pathogens in Southern Africa, their etiologies and methods of control; Plant quarantine procedures in Southern Africa. Biology, ecology and control (cultural, chemical and biological) of major forest insect pests and stem/wood borers; Useful forest insects. Forest Fire Management: causes, prevention and suppression.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Forest Mensuration
Code	AFOR 3881
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
Equip students with the different techniques of vegetation measurements and data display which enable decision making regarding forest management.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate knowledge of mensuration systems, concepts and models
- Demonstrate skill in using mensuration instruments to determine tree parameters such as basal area, canopy cover, and stand volume.
- Utilize forest mensuration data to determine sustainable harvesting, taking into account recruitment rate and growth increment

Course content

Introduction; importance of forest mensuration, scientific basis of measurement, Measurement scales. Precision, Accuracy and biases in measurements. Measurements of tree parameters: diameter, height, tree form/taper/stem analysis and bark thickness. Tree age and growth determination. Volume calculation estimations. Wood weight estimates, density and moisture content. Estimation of stand parameters; basal area, volume, stocking, species diversity, structure and composition. Stand growth and increment: CAI, PAI, MAI. Site quality assessment.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course Title: Field Attachment II	
Course Code	AACA 3701
NQF Level	7
Contact hours	Six weeks of Field Attachment
Notional Hours	60
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
The aim of this course is to expose students to practical know-how in the field under the supervision of a technical expert in order for students to come to terms with technology and limitations under a working environment.	

Learning outcomes

Upon completion of the course, students should be able to:

- Apply theoretical knowledge to analyse situations and execute appropriate actions in a work environment relevant to their training
- Execute more administrative duties at the office including permit issue, report writing, budgeting and planning, under less supervision than given in Attachment I
- Display increased ability to take more responsibility and supervise basic operations in the institution of attachment
- Initiate research programs to address problems noted during attachment
- Appraise operations of their institution of attachment and other related institutions and present findings

Course content

Six weeks of field attachment; at the end of the third year first semester, students will be attached to industries and institutions dealing with environmental/natural resource management selected to ensure that the objectives of off-site training are attained. An attachment report and oral presentation will constitute the total assessment mark. Students will be visited during their attachment on-site to check on the efficiency of attachment.

Assessment strategies: 50 % report presentation at a seminar; 50 % Field report. Subject to satisfactory attendance and conduct during attachment.

Course title:	Project Planning and Management
Code	AGEC 3881
NQF level	8
Contact hours	Lectures: 3x 1hrL/W for 14 weeks (42hrs); Practicals: 1 x 1hr Prac/W for 14 weeks (14 hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	AAEC 3691 Principles of Microeconomics
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
The course exposes students to principles and applications of project planning and management in agriculture.	

Learning outcomes:

Upon completion of this Course, the student should be able to:

1. Describe the project cycle and management concepts
2. Identify and formulate plans of sound agricultural projects among alternative development opportunities which are likely to accelerate economic development most rapidly;
3. Identify project benefits and target groups and weaknesses and risks and provide remedial measures
4. Identify various types and sources of data (technical) required in project planning and management.
5. Use economic and financial analysis techniques to evaluate projects.
6. Manage and monitor agricultural projects.
7. Use best practices in agricultural project planning and management in order to improve project sustainability.

Course 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

Assessment Strategies

Continuous assessment 60% (minimum 2 tests and 1 assignment) Examination 40% (1 x 3 hour paper)

Course title:	Forest Inventory
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Code	AFOR 3882
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	AFOF 3881: Forest Mensuration
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
Equip students with knowledge and skills of forest inventory and application of forest inventory in management of forest resources.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate knowledge of theory and techniques of forest inventory
- Demonstrate skill in using inventory techniques to determine quantities and value of forest resources
- Design and conduct forest inventories with little or no supervision, compile inventory reports, and utilize inventory data in forest planning and management

Course content

Introduction to forest inventory. Purpose and planning of forest inventory. Sampling and samplings design; simple random sampling, systematic sampling, stratified sampling, cluster sampling, regression estimators, double and two stage sampling, point sampling. Types of forest inventory. Volume estimation of selected indigenous species. Assessment of other forest values. Data recording and processing in forest inventory. Recent developments in forest resource assessment. Introduction to remote sensing and its application in forest inventory. Interpretation of aerial photographs and forest classification.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Forest Economics and Marketing
Code	AFOR 3812
NQF level	8
Contact hours	Lectures: 4 x 1hr/wk for 14 weeks (56hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	160
NQF Credits	16
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
To introduce students to the principles of forest economics including land valuation, input and output costs as well as wood marketing mechanisms.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate substantial understanding of economic concepts and economics of resource conservation
- Apply methods to calculate input costs, private benefits versus social costs/benefits of forest harvesting
- Estimate values (pricing) of forest resources
- Compare cost-benefit analysis of small, medium and large scale forestry operations;
- Carry out market research; design a marketing strategy and promotion of products

Course content

Forest economic concepts, economics of resource conservation. Peculiarities of forestry: production period, interest rates. Costing of forest operations and their analysis. Methods of input costing – private versus social costs and private versus social benefits. Depreciation methods and determination of maintenance costs. Techniques of appraising forest investments: NPV, IRR, CBR, Subsidies, taxes, interest rates, risks and uncertainties. Economics of forestry operation: choice of species, spacing, economics of pruning, thinning, extraction. Forest valuation: stumpage appraisal, valuation of forest land, forest rotation. Principles of shadow pricing, economies and diseconomies of scale

in forestry operations. Maximum sustainable yield and maximum economic yield. Work-study procedures... Economics of forest conservation. Techniques of evaluating protected areas: recreation sites, national parks, community forests, conservancies, etc. Principles of marketing, market research and promotion.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Forest Management
Code	AFOR 3892
NQF level	8
Contact hours	Lectures: 4 x 1hr/wk for 14 weeks (56hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
To introduce students to the principles and strategies for sustainable management of forests and woodlands, the different harvesting operations, equipments and techniques used in harvesting wood from natural woodlands in developing countries and planning and administration of forest estates.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate in depth understanding of forest management and forest harvesting practices
- Plan, design a logging operations taking into account costs of operations
- Compare and contrast different harvesting systems and evaluate their relevance to Namibian ecological conditions
- Develop management plans for forests and woodlands in Namibia
- Demonstrate basic understanding of organization and administration of forest enterprises in Namibia

Course content

Scope of forest management. Theory and practice of normal forest. Estimation of growth and yield: growing site index equations, yield models, current yield and future yields. Sustained yield. Rotation, allowable cut, cutting cycle. Sustainable exploitation of woodlands (community forests, concession areas, private woodlands (private farms). Transportation of wood materials, Ergonomics and work safety. Forest management plans; development, implementation, monitoring and evaluation. Forest organisation in Namibia. Administration of forest enterprises; records, personnel management, programs of work.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

FOURTH YEAR COURSES: ENVIRONMENTAL SCIENCE SPECIALIZATION

Course title:	Research Project (Environmental Science)
Code	AENV 3810
NQF level	8
Contact hours	Consultation: 1 x 1hr/wk for 28 weeks (28 hrs)
Notional Hours	320
NQF Credits	32
Pre requisite	ACSC 3792: Research Methods
Compulsory/Elective	Compulsory
Semester offered	1 and 2
Course aims	
To equip students with skills needed to carry out independent research in the field of environmental science including planning, designing, methodology, data analysis and result interpretation, discussion and dissemination of findings.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Identify researchable problems and develop research project proposals with minimum assistance
- Implement a research project; analyze data statistically, interpret results and write up, independently or with little supervision
- Demonstrate ability to make high quality presentations to a wide audience using well formulated arguments to express and support research findings

Course content

Senior undergraduate 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% (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).

Course Title: Field Attachment II	
Course Code	AACA 3701
NQF Level	7
Contact hours	Six weeks of Field attachment
Notional Hours	60
NQF Credits	8
Prerequisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2
Course Aims	
The aim of this course is to expose students to practical know-how in the field under the supervision of a technical expert in order for students to come to terms with technology and limitations under a working environment.	

Learning outcomes

Upon completion of the course, students should be able to:

- Apply theoretical knowledge to analyze situations and execute appropriate actions in a work environment relevant to their training
- Execute more administrative duties at the office including permit issue, report writing, budgeting and planning, under less supervision than given in Attachment I
- Display increased ability to take more responsibility and supervise basic operations in the institution of attachment
- Initiate research programs to address problems noted during attachment
- Appraise operations of their institution of attachment and other related institutions and present findings

Course content

Six weeks of field attachment; at the end of the third year, semester 1, students will be attached to industries and institutions dealing with environmental/natural resource management selected to ensure that the objectives of off-site training are attained. An attachment report and oral presentation will constitute the total assessment mark. Students will be visited during their attachment on-site to check on the efficiency of attachment.

Assessment strategies: 50 % report presentation at a seminar; 50 % Field report. Subject to satisfactory attendance and conduct during attachment.

Course title:	Environment and Development
Code	AENV 3881
NQF level	8

Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
The course aims to equip students with knowledge that enables them to develop conservation approaches that focus on causes of environmental problems and not the symptoms and elaborate on the link between Conservation and development and the objectives of Multilateral Environmental Agreements	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate substantial knowledge of the place of environment in sustainable development, approaches to environmental conservation, national policies and strategies of environmental conservation and international convention on environmental conservation
- Use case-studies to analyze development projects' compliance to sustainable development principles and advice on future projects.
- Conduct environmental impact assessment of existing and new development projects and report findings
- Appraise environment conservation policies, conventions and strategies usefulness in addressing environmental concerns in Namibia and the globe at large

Course content

Concepts of development and underdevelopment. Measurements of development. Links between environment and development. Sustainable development; concepts, principles(Triple bottom line) and approaches. National approaches and tools for sustainable development; EIA, state of the environment reporting, national strategy.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Environmental Pollution and Control
Code	AENV 3891
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr alternate for 14 weeks (14hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
Equip students with knowledge required to identify, measure and quantify pollution in different ecosystems (aquatic, terrestrial and atmosphere) and devise mitigation strategies to reduce the pollution	

Learning outcomes:

Upon completion of the course, students should be able to:

- Identify pollutants that possess potential danger to the environment, their origin and possible transmission mechanisms
- Demonstrate skills and knowledge of techniques for quantifying pollution levels and/or wide variety of pollutants in differing components of the environment (atmosphere, water, soil etc)
- Evaluate operations of mining, agricultural projects and a wide variety of industries and recommend strategies of guarding against or mitigating environmental pollution

Course content

The environment as a source and sink of resources and wastes.The concept of environmental degradation and pollution.The state of environmental pollution in Namibia.Classification of pollutants.Types of urban pollution.Measurement, dispersion and transportation of urban pollutants.Impact of urban pollution. Control

strategies. Domestic/industrial water pollution; measurement, treatment and control. Agricultural pollutants and ecosystems. Use of environmentally friendly agrochemicals and fertilizers and alternative methods of pest control (biotechnology).

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Watershed Management
Code	AENV 3801
NQF level	8
Contact hours	Lectures: 2 x 1hr/wk for 14 weeks (28hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	80
NQF Credits	8
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	1
Course aims	
The course aims at introducing the concept of watershed approach to resource-oriented planning and development, and as a unit of land and water management emphasizing on land use systems and water resources in Namibia	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate a deep understanding of physical features of a watershed and how they are impacted by land-uses and in-turn determine hydrological characteristics of the watershed
- Apply suitable hydrological analysis techniques for collection of field data and information on hydrological processes and land management at a watershed level
- Critically evaluate the impact of different land-uses on quality and water delivery characteristics of a watershed and advice on appropriate land-uses and land management practices under various ecological and socio-economic scenarios
- Apply holistic, ecosystem approach to watershed management and planning

Course content

The watershed as a unit of resource-oriented planning and development. Principles and objectives of watershed management. Physical description of watersheds. Relationships between land use conditions and water delivery characteristics of watersheds. Management and development of water sources in Namibia; perennial and ephemeral rivers, underground water, role of river basin authorities. Water harvesting. Watershed analysis including; techniques, collection of field data and sources of information.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Management of Arid and Semi-arid Lands
Code	AENV 3882
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
The course aims at enhancing the students understanding of characteristics of arid and semi-arid lands, their management challenges and potential economic exploitation options	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate substantial knowledge of the dynamics / variability of arid and semi-arid lands in Namibia in terms of primary productivity, climate and water resources availability and use
- Evaluate impacts of human use on arid and semi-arid lands' productivity/health giving special attention to factors causing desertification/degradation of ASALS
- Apply various techniques to restore, reclaim degraded arid and semi-arid lands
- Develop strategies for enhancing sustainable economic exploitation of arid and semi-arid lands under different ecological and socio-economic scenarios

Course content

Characteristics of arid and semi-arid lands; concept of aridity, categories of drylands, characteristics of drylands, changes in drylands. Land use practices; traditional land use practices, crop production, pastoralism, game ranching, tourism and wildlife. Environmental management issues; desertification, land degradation, and prevention of land degradation. Types and methods of Interventions in management of drylands and their impacts. Reclamation and sustainable development of ASALS. Case studies in Namibia and the SADC region.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Environmental Planning and Management
Code	AENP 3882
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
The course aims at equipping students with knowledge and skills of planning for natural resource management.	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate an deep understanding of the environmental planning elements and processes
- Conduct surveys to collect data relevant to environmental planning
- Develop and implement environmental management plans

Course content

Concepts of planning and management. Planning tools and processes: physical, human and institutional resources. Basic methods in planning and management of the environment. Environmental management plans: types, development, implementation, monitoring and evaluation.

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Environmental Impact Assessment
Code	AENE 3882
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	AIES 3782: Natural Resource Governance

Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
To familiarize students with the process and techniques of Environmental Impact Assessment required for fulfillment of sustainable environmental development	

Learning outcomes:

Upon completion of the course, students should be able to:

- Design an Environmental Impact Assessment process into a project plan
- Apply policies in the context of monitoring and controlling project activities
- Conduct Environmental Impact Assessment on existing and new projects, prepare EIA reports and recommend mitigation measures
- Appraise available EIA techniques and methods and determine the best methods for assessing different projects and different prevailing circumstances

Course 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 of 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% (At least three assessments); Exam: 60% (1 x 3 hr paper)

Course title:	Environmental Education
Code	AENE 3892
NQF level	8
Contact hours	Lectures: 3 x 1hr/wk for 14 weeks (42hrs); Practicals: 1 x 2hr/wk for 14 weeks (28hrs)
Notional Hours	120
NQF Credits	12
Pre requisite	None
Compulsory/Elective	Compulsory
Semester offered	2
Course aims	
The aim of this course is to discuss the significance of and methods applied in environmental education at national, regional and global level	

Learning outcomes:

Upon completion of the course, students should be able to:

- Demonstrate a profound understanding of the genesis, evolution and principles of environmental education
- Demonstrate comprehension of the inter-linkages between different conservation institutions and their roles in environmental education
- Develop and implement basic environmental education programmes
- Identify and evaluate national, regional and global strategies for environmental education

Course Content

General principles of environmental education. Environmental awareness and ethics. Environmental educational institutions: nature history museums, herbaria, zoos and botanical gardens, national parks, reserves. Methods of environmental education. Publicizing and advertising environmental issues. Environmental education in primary and secondary schools in Namibia. Environmental education in media. Environmental education at regional and global level

Assessment strategies

Continuous assessment: 40% (At least three assessments); Exam: 60% (1 x 3hr paper)

K. B.SC. WILDLIFE MANAGEMENT & ECOTOURISM (HONS) [17BSWL]

All modules listed below, except English Communication and Study Skills, English for Academic Purposes and Contemporary Social Issues, will be offered by Faculty of Science. English Communication and Study Skills, English for Academic Purposes, Contemporary Social Issues and Computer Literacy are University Core Modules taken by all First Year University of Namibia students.

K.1 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	
SBLG 3511	Introduction to Biology	4	16	C	
HGHE 3581	Fundamentals of Physical Geography	5	12	C	
SMAT 3511	Basic Mathematics	5	16	C	
Total Credits Semester 1					68
Year 1 Semester 2					
ULEA 3519	English for Academic Purposes	5	16	C	
UCSI 3580	Contemporary Social Issues	5	8	C	
SCHM 3532	Chemistry for Life Sciences	5	16	C	
SBLG 3512	Diversity of Life	5	16	C	
HGHE 3582	Fundamentals of Human Geography	5	12	C	
Total credits Semester 2					68
TOTAL CREDITS YEAR 1					136
Year 2 Semester 1					
AWLM 3611	Wildlife Ecology	6	16	C	
AWLM 3601	Wildlife Management	6	8	C	
AWLM 3631	Ecotourism	6	16	C	
AWLM 3671	Wildlife Nutrition	6	8	C	
AWLM 3651	Systematic Botany	6	16	C	
AWLM 3681	Freshwater Ecology	6	12	C	
Total Credits Semester 1					76
Year 2 Semester 2					
AWLM 3682	Ornithology	6	12	C	
AWLM 3602	Mammalogy	6	8	C	
AWLM 3642	Wildlife Diseases	6	8	C	
AWLM 3612	Ecology of African Ecosystems	6	16	C	
AWLM 3662	Geo-informatics for Wildlife Management	6	8	C	CLC 3509: Computer Literacy
AWLE 3602	Ethnobotany	6	8	C	
ACSC 3692	Biostatistics	7	12	C	None
Total credits Semester 2					72
TOTAL CREDITS YEAR 2					148
Year 3 Semester 1					
AWLM 3701	Governance of Wildlife Resources	7	8	C	AWLM 3601: Wildlife Management
AWLM	Wildlife Conservation	7	12	C	HGHE 3582: Fund. Phys.

3781					Geography
AWLM 3721	Ecological Methods in Wildlife Studies	7	8	C	AWLM 3611: Wildlife Ecology
AWLM 3741	National Parks & Game Reserves	7	8	C	AWLM 3781: Wildlife Conservation
AWLM 3712	Animal Behaviour	7	16	C	AWLM 3682: Ornithology; AWLM 3602: Mammalogy
AACA 3701	Field Attachment I	7	8	C	
Total Credits Semester 1					60
Year 3 Semester 2					
AWLM 3702	Genetic Conservation	7	8	C	AWLM 3781: Wildlife Conservation
AWLM 3722	Wildlife Survey & Monitoring Techniques	7	8	C	
AWLM 3742	Habitat Management	7	8	C	AWLM 3781: Wildlife Conservation; AWLM 3601: Wildlife Management
AWLM 3732	Systematics of Birds and Mammals	7	16	C	AWLM 3682: Ornithology; AWLM 3602: Mammalogy
AWLM 3782	Herpetology & Terrarium	7	12	C	AWLM 3611: Wildlife Ecology
CSC 3792	Research Methods	7	12	C	CSC 3692: Biostatistics
Total credits Semester 2					64
TOTAL CREDITS YEAR 3					124
Year 4 Semester 1					
AWLM 3801	Freshwater Ichthyology & Aquaculture	8	8	C	AWLM 3681: Freshwater Ecology
AWLM 3811	Entomology	8	16	C	SBLG 3512: Diversity of Life
AWLM 3821	Economics of Wildlife Resources	8	8	C	AWLM 3601: Wildlife Management
AWLM 3881	Environmental Impact Analysis	8	12	C	AWLM 3611: Wildlife Ecology
ACA 3801	Field Attachment II	8	8	C	
AWLM 3810	Research Project	8	16	C	CSC 3782: Research Methods
Total Credits Semester 1					66
Year 4 Semester 2					
AWLM 3802	Ecotourism Marketing and Travel Plan Development	8	8	C	
AWLM 3822	Wildlife in Agriculture Ecosystems	8	8	C	
AWLM 3882	Biogeography	8	12	C	AWLM 3662: Geo-Informatics for WLM
AWLM 3841	Digital Wildlife Photography	8	8	C	
AWLM 3842	Environmental & Ecotourism Education	8	8	C	CSI 3529: Contemporary Social Issues
AWLM 3810	Research Project	8	16	C	CSC 3782: Research Methods
Total credits Semester 2					60
TOTAL CREDITS YEAR 4					126
TOTAL CREDITS FOR THE PROGRAMME					534

K.2 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 description: 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.

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 description: 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.

SBLG 3511: INTRODUCTION TO BIOLOGY

Module title: INTRODUCTION TO BIOLOGY

Code: SBLG 3511

Course Equivalent: Biology 1A

NQF level: 4

Contact hours: 4 lectures/ week for 14 weeks and one 3-hour practical session per week.

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.

Prerequisites: NSCC (Biology C or better)

Module description (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 domain 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.

HGHE 3581: FUNDAMENTALS OF PHYSICAL GEOGRAPHY

HGHE 3581 Fundamentals of Physical Geography

Proposed NQF Level: 5 **Credits:** 12 **Contact Hours:** 3 hours/week over 14 weeks = 42 contact hours

Content: Students acquaint themselves with the essential foundations of Physical Geography, including common links to auxiliary disciplines and fields of study. The course presents structures, functions, processes and distributional patterns inherent in phenomena of "natural" environments, relating to climate, geomorphology, hydrology, soils and vegetation. The content focuses on the interrelationship of geo-ecosystems, including the human factor. With particular reference to Namibian conditions, the course offers fundamental applications of concepts inherent in the functioning of the atmo-, litho-, hydro- and biosphere.

Assessment: Continuous assessment 60% : Examination 40% (1 x 3 hour examination paper)

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 description (Content): Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, remainder 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 description: 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.

CSI 3580 CONTEMPORARY SOCIAL ISSUES

Module Title: CONTEMPORARY SOCIAL ISSUES
Code: CSI 3580
NQF: 5
Credits: 8
Prerequisite: None

Module Description:

This course, Contemporary Social Issues (CSI), encourages behavioural change among UNAM students, with special reference to their sexual behaviour and to inculcate the primacy of moral reasoning in their social relations and their academic lives. In achieving the above aim, the following values and approaches will inform the CSI: Material will be presented on an integrative basis, stressing the interconnections amongst ethics, moral reasoning, citizenship, leadership, and values and approaches that direct to responsible social behaviour. Special emphasis will be placed on the construct of citizenship and its relation to democracy and the common good. Critical transformative theory will under gird the content of CSI. After completion of the CSI students will be empowered in the domains of human

Aims of the Course:

- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Present/Offer on an integrative and inter-disciplinary basis the six broad themes on learning strategies and approaches; norms, rules, and human conduct; leadership, citizenship, democracy, and common good; ethics; health and human sexuality, and environment and sustainability, sexuality, reproductive health, democracy, the environment, sustainable development, and responsible leadership. Flexible modes of assessment may be harnessed and students are required to sign the class attendance list each time after a class session. Compulsory attendance required.
- ❖ Explore the dimensions of ethical and moral choices,
- ❖ Introduce students to the values, norms, rules and conduct of moral reasoning,
- ❖ Identify and reflect upon some of the key CSI from the perspectives of contextual social ethics,

- ❖ Deepen understanding of the construct of citizenship,
- ❖ Apply/utilize/evoke critical theory that is transformative and empowering,
- ❖ Broaden the student's scope and understanding of the environment and sustainability of the ecosystem services and how humans influence these, and
- ❖ Educating the whole person and thereby prepare undergraduates to enjoy productive, meaningful careers and lives that benefit a society that increasingly resembles a global community.

Learning Outcomes:

This course, CSI, is built upon learning outcomes. For that reason each unit or theme starts with its own learning outcomes. The focus on learning outcomes not only serves to demarcate the contents for each unit or theme. It also is the basis of the assessment of the programme as well as the evaluation of the students. Therefore,

On completing the course, students should be able to:

- ❖ Practice ethical reasoning,
- ❖ Demonstrate knowledge to make informed decisions as responsible citizens,
- ❖ Empower students to responsible behaviour changes and to transform high risk behaviour to the common good and responsible citizenship and give back such values to the community, nation, and world,
- ❖ Sensitise towards the meaning of values and morals and how they affect the attitudes of individuals and groups toward population issues,
- ❖ Recognise the need of balance between freedom and responsible behaviour,
- ❖ Discuss stewardship/custodianship of the environment and sustainability of ecosystem services, and
- ❖ Explain how human activities affect the environment and the sustainability of ecosystem services.

Assessment Strategies:

❖ **Continuous flexible modes of assessment (100%).**

The purpose of this evaluation is to assess whether the teaching of the course has resulted in the accomplishment of the aims of the course in each student. This evaluation is therefore focused on assessing the impact of the course in individual students. Various methods can be used: written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, essays, or reflections upon a theme or topic. Students should be graded based on continuous flexible modes of assessment (100%), and the Course Coordinator in consultations with the lecturers shall select the same written tests, multiple choice quizzes, assignments or brief reports, case analyses, presentations, etc. that shall be given to the students throughout the year.

❖ **Profile or Student's File:**

It is required from each lecturer to keep proper profile or student's file where all the written assignments shall be kept. The student has the right of access to her/his profile during the Academic Year. At the end of the Academic Year the average percentage shall be work out based on the continuous flexible modes of assessment.

❖ **Evaluation of the lecturer:**

After completion of the course the teaching should be evaluated. Students shall be invited to provide feedback on the teaching of lecturer/lecturers. The purpose of this evaluation is to identify how the course and the teaching can be improved.

Resources and Literature:

This course, CSI, is built upon various learning resources. For that reason each unit or theme shall include its own relevant literature or resources for further consultations.

Course Content:

Following six (6) broad themes shall be covered:

Learning Strategies and Approaches:

Accountability and Responsibility, including plagiarism; Facilitative Learning; Reflective practice when dealing with and discussion of case studies, and value of knowledge to make informed decision.

Norms, Rules, and Human Conduct:

Values, responsibilities, rights and conduct as a choice for or against good and evil actions and to know the difference between right and wrong.

Leadership, Citizenship, Democracy and Common Good:

People want to make sure that leadership adopt and implement ethical codes of conduct, avoid corruption practices, provide job security, support the needs and concerns of the nation as the whole. This means that responsible leadership is expected to play a proactive role and contribute to build a sustainable and humane society.

What is citizenship and why does it matter? Complex citizenships: rights-based conceptions of citizenship and the construct of membership as entitlements (focusing on the formal prerequisites for political participation); substantive citizenship and its accompanying responsibilities granted to individuals (rather than groups) by the state. The construct of rights granted to citizens; liberty of the person, freedom of thought and faith and the right to justice. Democracy as a historical and social construct; rights and obligations under democracy; social democracy and empowerment; from rights-based constructs of democracy to social democracy and the common good.

Ethics: Global Ethic as a minimal fundamental consensus concerning binding values, irrevocable standards, and fundamental moral attitudes, and Ethics in Context from African Perspectives, especially with reference to the concept of a connected humanity (Ubuntu), self-worth (personhood), etc.

Health and Human Sexuality:

Health and sexually-related challenges and theoretical approaches and strategies on health, health disparities, ethical issues in medical research, sexuality-related challenging issues such as sexual orientation, HIV and AIDS, substance abuse and non-communicable diseases, etc., concepts of gender, in particularly gender based violence and power relations.

Environment and Sustainability:

Awareness of the resources and fragility of the physical environment, the effects of human activity on the environment, environmental protection and bio-diversity. Contemporary issues such as sustainable development, environmental sustainability, globalisation, include climate change, the global food crisis and on-going financial and economic crisis. The responsible citizens towards the environment, and the issues related the right to a healthy and clean environment and the responsibilities of citizens to make sure that it is sustainable. From responsible leadership it is demanding that business and industry behave responsibly and contribute to develop a sustainable society.

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 Description:

This module is designed for students that have insufficient background in chemistry and for non-chemistry majors .It is an introduction to topics in general and organic chemistry, and biochemistry. The following will be covered:

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.

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 than 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSSC (Biology C or better)

Module description (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 Myxiniiformes, Petromyzontiformes, Placoderms, Chondrichthyes, 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

PART B: COURSE SPECIFICATION

COURSE TITLE: WILDLIFE ECOLOGY

COURSE CODE	AWML 3611
NQF LEVEL	6
CONTACT HOURS	LECTURES: 4 X 1HR/WK FOR 14 WEEKS (56HRS); PRACTICALS: 3 HR/WEEK FOR 14 WEEKS (42HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1

COURSE AIMS

The course introduces students to the structure and function of ecosystems and how the physical and chemical characteristics of an ecosystem shape animal communities and influence the process of succession. This course is also designed to equip students with necessary understanding of population structure and dynamics, theory and techniques of population analysis, population growth models and factors controlling population growth.

Learning outcomes

Upon completion of the course, students should be able to:

- Identify the key components of an ecosystem and demonstrate how the components relate to each other.
- Identify abiotic and biotic factors that influence animal adaptations, distributions and abundances
- Compare the structure, composition, diversity and conservation significance of different animal communities

- Apply succession models to analyze succession stage of a given landscape
- Apply the concepts of habitat utilization, essential processes and ecological systems to population studies
- Demonstrate ability to utilize different analytical techniques to quantify and analyze simple and complex characteristics and processes of animal communities
- Compare effectiveness of different models in presentation of ecological phenomena
- Carry out guided field studies to validate simple population theories and hypotheses

Course content

Concept of ecology. Organism and its environment (adaptation, water and thermal balance, light, soil). Ecosystem ecology: energy flow, biomass, trophic levels, biogeochemical cycles. Major ecosystems of southern Africa, with special reference to Namibia. Community ecology: structure, stability, disturbance, diversity, patterns. Ecological succession. Properties of populations: distribution, densities, age and sex structure, mortality and natality, survival, migration and immigration. Population regulation. Interspecific relationships: competition, predation, commensalism, amensalism, mutualism. Feeding niche. Life histories patterns

Assessment strategies

Continuous assessment: 50% (at least 2 tests, practical assessments); Exam: 50% (1 x 3 hr paper).

COURSE TITLE: WILDLIFE MANAGEMENT	
COURSE CODE	AWLM 3601
NQF LEVEL	6
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
This course is designed to give students a broad understanding of principles and practices of wildlife management with emphasis to practices in Namibia and other SADC countries.	

Learning outcomes

Upon completion of the course, students should be able to:

- Value wildlife to human existence.
- Analyze the influence of biophysical and human factors in shaping wildlife populations
- Apply basic scientific principles in solving simple wildlife management problems
- Develop a management plan for game ranch
- Evaluate wildlife trophies

Course content

An introduction to basic principles used in the management of wildlife populations, their habitats and their human users. General concepts in ecological processes; population dynamics and structure; life history patterns, biotic and abiotic factors structuring wildlife populations and endangered species. Response of wildlife to human. Plant-herbivore system. Herbivore-carnivore system. Predation of domestic animals and by domestic animals. Wildlife species and their characteristics: antelope and other smaller herbivores, large herbivores, predators, ostriches, combining wild and domestic herbivores. Game ranch planning: fences, water holes, roads. Wildlife management techniques. Harvesting, hunting and capturing wild animals. Handling and measuring trophies. Wildlife management and rural development.

Assessment strategies

Continuous assessment: 40% (at least three assessments); Exam: 60% (1 x 2 hr paper)

COURSE TITLE: ECOTOURISM	
COURSE CODE	AWLM 3631
NQF LEVEL	6
CONTACT HOURS	LECTURES: 4 X 1HR/WK FOR 14 WEEKS (56HRS); PRACTICALS: 3 HR/WEEK FOR 14 WEEKS (42HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	HGHE3511: Fundamentals of Physical Geography
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
This course is designed to give students basic knowledge on the wildlife tourism. It aims to familiarize students with main form of ecotourism and develop abilities for ecotourism planning and guiding.	

Learning outcomes

Upon completion of the course, students should be able to:

- Apply ecotourism principles for nature conservation
- Analyze the positive and negative influence of ecotourism on wildlife management and conservation
- Demonstrate the ability for ecotourism field guiding and marketing.
- Create a conducive environment for ecotourism development
- Develop management plans for ecotourism travel

Course content

Major goals of ecotourism; tourism and wildlife habituation; negative impact of wildlife tourism; field guiding practice; forms of ecotourism: angling, trophy-hunting, bird-watching, marine and coastline tourism, primitive camping; ecotourism internship; hospitality and ecotourism development.

Assessment strategies

Continuous assessment: 40% (at least three assessments, practical assessments); Exam: 60% (1 x 3 hr paper)

COURSE TITLE: SYSTEMATIC BOTANY	
COURSE CODE	AWLM 3651
NQF LEVEL	6
CONTACT HOURS	LECTURES: 4 X 1HR/WK FOR 14 WEEKS (56HRS); PRACTICALS: 3 HR/WEEK FOR 14 WEEKS (42HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The course introduces students to morphology, anatomy and systematic of plant species, with special reference to southern African flora.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a deep knowledge on plant classification system
- Identify plant species down to species or genus level, especially trees, shrubs and grasses of importance to the wildlife
- Develop a local herbarium
- Conduct a thorough analysis of plant communities for site evaluation for nature conservation

Course content

Introduction to plant taxonomy. Plant anatomy and morphology. Taxonomic concepts, plant classification, nomenclature. Trees, shrubs, grass and herbs identification. Botanical keys: types and use. Specimen collection. Major plant families in southern Africa, with special reference to Namibia.

Assessment strategies

Continuous assessment: 50% (at least three tests, practical assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: FRESHWATER ECOLOGY	
COURSE CODE	AWLM 3681
NQF LEVEL	6
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (42HRS); PRACTICALS: 1 X 3HR ALTERNATE FOR 14 WEEKS (21HRS)
NATIONAL HOURS	120
NQF CREDITS	12
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
This course equip students with knowledge on the structure and function of aquatic ecosystems in Namibia and other SADC countries, and their management and potential economic exploitation options	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a knowledge on aquatic ecosystems in Namibia and other SADC countries
- Analyze ecological structure and function of aquatic habitats
- Evaluate aquatic habitats for wildlife management
- Recognize threats to aquatic habitats and develop appropriate conservation plan

Course content

Abiotic parameters influencing productivity of aquatic ecosystems. Diversity, structure and functioning of various community structures: phytoplankton, zooplankton and benthos. Direct and indirect interactions between the biotic and abiotic components of the aquatic ecosystems. Interspecific relationships. Reproduction tactics, growth, survival and fecundity of producers and consumers. Aquatic ecosystems of Namibia and other SADC countries. Management and conservation of aquatic habitats

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: ORNITHOLOGY	
COURSE CODE	AWLM 3682
NQF LEVEL	6
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	120
NQF CREDITS	12
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course introduces students to biology of birds, their ecology and evolution. Additionally it addresses the human threats to birds and their habitats.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a deep understanding of the biology of birds and mammals, with an emphasis on their ecology, and evolution
- Identify threats to the existence of birds and design scientifically sound management plans/strategies for their conservation.

Course content

Ornithology as science. Anatomy and morphology. Eco-physiology. Distribution, demography and habitat selection. Territoriality versus coloniality. Avian communities. Reproductive biology and ecology. Breeding strategies (mating systems, brood parasitism, co-operative breeding). Feeding ecology. Biogeography. Migration. Bird conservation.

Assessment strategies

Continuous assessment: 40% (at least three assessments); Exam: 60% (1 x 3 hr paper)

COURSE TITLE: MAMMALOLOGY	
COURSE CODE	AWLM 3602
NQF LEVEL	6
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course introduces students to biology of mammals, their ecology and evolution. Additionally it addresses the human threats to mammals and their habitats	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a deep understanding of the biology of mammals, with an emphasis on their ecology, and evolution
- Identify threats to the existence of mammals and design scientifically sound management plans/strategies for their conservation.

Course content

Comparative anatomy and physiology. Distribution, numbers and habitat selection. Reproductive biology and ecology. Feeding ecology. Communication, orientation and echolocation. Life cycles. Climatic adaptations. Natural and human threats to habitats of mammal. Conservation strategies.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: WILDLIFE NUTRITION	
COURSE CODE	AWLM 3622
NQF LEVEL	6
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course is designed to give students knowledge on feeding requirements of wildlife species, their food composition. It also aims to familiarize students with plant chemicals, toxins affecting herbivores and mineral deficiencies	

Learning outcomes

Upon completion of the course, students should be able to:

- Analyze food composition of wildlife animals
- Evaluate food quality consumed by wildlife animals
- Recognize toxic plants in the ranch and develop plan to eradicate them
- Calculate grazing and browsing capacity

Course content

Anatomy and physiology of digestive system; digestion in herbivores; feeding ecology of wildlife species; diet composition and analysis; nutritional value of plants; plant chemicals and toxins; management of toxic plants and affected game; water quality and water requirements; mineral deficiencies and supplementary feeding; nutrition in captivity.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: WILDLIFE DISEASE	
COURSE CODE	AWLM 3642
NQF LEVEL	6
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
This course aim to impart an understanding of the concepts of disease transmission, etiology and clinical signs of common diseases affecting wildlife in Namibia and other the SADC countries, with emphasis on applicable methods to control, prevent, treat diseases and prevent their transmission to domestic animals.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate substantial knowledge of disease transmission, etiology and clinical signs and common diseases affecting African wildlife and related disease occurrence to wildlife population densities and human influences
- Apply techniques of basic necropsy review for collecting field samples and other methods used in study of wildlife diseases
- Analyze and conduct investigations into simple and complex disease relationships between wildlife, livestock and humans utilizing case-studies in the SADC region

Course content

General principles. Recent advances of immunology. Viral, bacterial and protozoan diseases; ecto- and endoparasites (pathology, diagnosis, treatment and control). Epizootia and enzootia. Wildlife diseases investigation, preventive medicine. Physical and chemical restraint and anesthesia. Aspects of wildlife surgery.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: ECOLOGY OF AFRICAN ECOSYSTEMS	
COURSE CODE	AWLS 3612
NQF LEVEL	6
CONTACT HOURS	LECTURES: 4 X 1HR/WK FOR 14 WEEKS (56HRS); PRACTICALS: 3 HR/WEEK FOR 14 WEEKS (42HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course introduces students with a basic knowledge on the structure and function of savanna biome and semi-arid lands, their management and potential economic exploitation options.	

Learning outcomes

Upon completion of the course, students should be able to:

- Analyze the structure and functioning main southern African biomes.
- Evaluate potentials of various southern African biomes for wildlife management and ecotourism
- Demonstrate substantial knowledge of the dynamics / variability of main biomes in Namibia in terms of primary productivity, climate and water resources availability and use
- Evaluate human impacts arid and semi-arid lands' productivity/health giving special attention to factors causing desertification/degradation of marginal lands
- Apply various techniques to restore, reclaim degraded arid, semi-arid and savanna lands
- Develop strategies for enhancing biodiversity conservation and sustainable economic exploitation of arid and semi-arid lands under different ecological and socio-economic scenarios

Course content

Distribution of savanna biomes in Africa. Determinants of savanna structure and function: water, soil, nutrients, fire, herbivory. Vegetation of savanna: rich versus poor savanna. Energy flow and food web. Biodiversity of savanna.

Tree-grass and predator-prey interactions. Competition and mutualistic relationships. Population models. Managing savanna. Distribution of desert and semidesert biomes in Africa. Determinants of desert and semidesert structure and function: water, soil, nutrients, herbivory. Animal adaptations to live in desert. Vegetation of desert and semidesert. Energy flow and food web. Biodiversity of desert and semidesert. Interspecific relationships. Population models. Managing desert and semidesert.

Assessment strategies

Continuous assessment: 40% (at least three assessments); Exam: 60% (1 x 3 hr paper)

COURSE TITLE: GEO-INFORMATICS FOR WILDLIFE MANAGEMENT	
COURSE CODE	AWLM 3662
NQF LEVEL	6
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	UCLC3409: COMPUTER LITERACY; HGHE3511: FUNDAMENTALS OF PHYSICAL GEOGRAPHY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
To introduce students to the use of GIS and remote sensing programmes in monitoring animal populations and habitats as well as in solving problems related to wildlife management.	

Learning outcomes

Upon completion of the course, students should be able to:

- Define the role of Geographic Information Systems (GIS) and Remote sensing in natural resource management
- Describe different GIS data formats, and their use and application to various GIS applications and identify appropriate processing and analysis techniques to solve specific GIS related problems
- Use GIS software to assist with a decision making process; examine and interpret aerial photographs and satellite images, capture data using a hand-held GPS receiver, and build spatial datasets
- Appreciate the uses and limitations of GIS and Remote sensing for natural resource management and value the importance of high quality digital spatial data in natural resource management

Course content

Basic concepts, GIS data structures, processing and analysis techniques, basic cartography, map projections, introduction to GPS, basic aerial photograph interpretation. Use of GIS software. Use of GPS receiver. Display and manipulation of image files. Remote sensing for wildlife management, rangeland and vegetation monitoring.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

Course Title: BIostatistics	
Course Code	ACSC 3692
NQF Level	7
Notional Hours	120
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	None
Compulsory/Elective	Compulsory
Semester Offered	2
Course Aims	
This course equips the student with the knowledge on research methods, the types design, analysis and presentation.	

Learning Outcomes

Upon successful completion of this module, students should be able to:

1. Formulate and identify areas of research
2. Distinguish between different types of data and the appropriate analysis tools
3. Design and implement a research project

4. Collect meaningful data, analyse the data appropriately, interpret and present the results

Assessment Strategies

Continuous Assessment: 50% (minimum of 2 tests, a marked assignment and 5 marked practicals); Examination: 50% (1 x 2 hr paper).

COURSE TITLE: ETHNOBOTANY	
COURSE CODE	AWLE 3602
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course aims at enhancing the students knowledge on practice of ethnobotany, plant products and derivatives used as food, medicine and industrial raw materials, emphasizing on useful exotic and indigenous plant species in Namibia.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate vast knowledge of the contribution of biological diversity to human welfare with respect to plant products and derivatives, useful to man
- Search and access data bases to retrieve information on origin, taxonomy and uses of different plants among cultures in Namibia
- Evaluate pattern of plants use in the SADC region in terms of diversity of products, processing, marketing and limitations to utilization
- Design strategies for promoting sustainable harvesting of plant products

Course content

USEFUL AND TOXIC PLANTS, THEIR ORIGIN AND HISTORY OF PLANT USE. PLANT PRODUCTS AND DERIVATIVES USED IN NUTRITION, MEDICINE, BUILDING-CONSTRUCTION, CLOTHING. POTENTIALS FOR NEW CROP SPECIES. UTILIZATION INDIGENOUS VERSUS EXOTIC PLANTS.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: GOVERNANCE OF WILDLIFE RESOURCES	
COURSE CODE	AWML 3701
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	AWLM 3601: : WILDLIFE MANAGEMENT;
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
It introduces students to the process of formulating national and international environmental policy, laws and conventions on wildlife management and wildlife conservation.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate knowledge of natural resources laws, statutes and policies in Namibia
- Critique formulation process of national policies and international conventions
- Evaluate the relevance of key international conventions such as UNCBD, UNFCCC, UNCCD, CITES and RAMSAR to conservation efforts of individual governments

- Appraise progress made by national governments in implementing national and international laws, policies and conventions

Course content

Philosophy and law; law and policies concerning regulation of commerce in wildlife; wildlife conservation and management within the legal and policy frameworks governing management of private, communal and state lands; regulation of human-wildlife interactions; tenure regimes and policy framework; constraints to wildlife conservations among resource-poor rural populations.

Assessment strategies:

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: WILDLIFE CONSERVATION	
COURSE CODE	AWLM 3781
NQF LEVEL	7
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (42HRS); PRACTICALS: 1 X 3HR ALTERNATE FOR 14 WEEKS (21HRS)
NATIONAL HOURS	120
NQF CREDITS	12
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The course is design to give students basic knowledge on threats to species and their habitats, and to introduce main concepts and methods of nature conservation.	

Learning outcomes

- Upon completion of the course, students should be able to:
- Demonstrate knowledge on aims and purposes of nature conservation
 - Identify and valorize areas for nature conservation
 - Apply various methods in nature conservation
 - Apply nature conservation legislation

Course content

Concepts of wildlife nature conservation. Values and ethics of wildlife conservation. Species conservation. Extinction and endangered species. Key and charismatic species. National and international forms of area protection for wildlife. Conservation strategies. In situ and ex situ wildlife conservation. Wildlife Conservation and sustainable development. Wildlife conservation in urbanized and agricultural ecosystems. The economics of wildlife conservation. National and international legislation on nature wildlife conservation

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: ECOLOGICAL METHODS IN WILDLIFE STUDIES	
COURSE CODE	AWLM 3721
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	AWLM3611: WILDLIFE ECOLOGY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
This course is aimed to equip students with an array of modern methods in ecological studies of wildlife species and the knowledge on their application.	

Learning outcomes

- Upon completion of the course, students should be able to:
- Apply a wide array of methods to study various aspects of wildlife ecology
 - Evaluate various methods in relation to wildlife species and habitat
 - Develop a research proposal

Course content

Measuring species diversity, community similarities and niche width and overlap. Quantifying habitat selection. Determining diet composition, prey size and prey quality. Measuring the reproductive success. Determination of proximate causes of breeding failure. Measuring timing of reproduction and annual productivity. Methods of catching wildlife species: cage traps, nets, drugs; sexing, ageing, measuring and determining physical condition. Ringing and radio-tagging.

Methods of facilitation of learning

Lectures, written assignments, field work, class discussions and presentations.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

Quality assurance arrangements

- internal and external moderation of exam papers and scripts,
- peer review of course outlines and teaching
- student evaluation
- regular review of course content
- effective and efficient supervision and monitoring assignment, tests and exams

COURSE TITLE: NATIONAL PARKS & GAME RESERVES	
COURSE CODE	AWLM 3741
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
CO-REQUISITE	AWLM3781: WILDLIFE CONSERVATION
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The course is aimed to familiarize students with national parks and game reserves established in Namibia and other SADC countries. It equips students with the knowledge on evaluation of parks and game for ecotourism.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a deep knowledge on the location, landscape, plant and wildlife peculiarities of national parks, game and nature reserves in Namibia and other SADC counties
- Develop a plan for park and reserve management
- Evaluate the role of national parks and game reserve in wildlife conservation
- Apply the knowledge on national parks and game reserves for ecotourism development

Course content

Role of national parks and game reserves. Principles of management in national parks and game reserves. A review of southern African national parks and game reserves, with special reference to Namibia.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: ANIMAL BEHAVIOUR	
COURSE CODE	AWLM 3712
NQF LEVEL	7
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (42HRS); PRACTICALS: 1 X 3HR ALTERNATE FOR 14 WEEKS (21HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	AWLM3682: ORNITHOLOGY; AWLM3602: MAMMALOLOGY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
Introduce students to sources and types of different animal behavior including social behavior, and population interaction behavior and how knowledge of animal behavior is utilized in wildlife management.	

Learning outcomes

Upon completion of the course, students should be able to:

- Describe different types of wildlife behavior
- Develop a management plan on the basis of wildlife behaviour
- Demonstrate a deep understanding of animal behaviour including simplex and complex behavior and the biological foundation of animal behavior theories
- Analyze sign-stimuli responses, factors driving motivation and aggression in wild animals
- Conduct literature based or field investigations on various types of animal behaviour (mating, hunting, etc.) following standard or self designed techniques or procedures

Course content

Simple and complex behaviour. Sign-stimuli, motivation. Conflict behaviour, orientation, learning, genes and behaviour. Anti-predator behavior. Instinct. Behavioural ecology. Feeding behaviour; Social and non-social behaviour; Aggression; Sexual behavior. Effects of environment on breeding. Ungulate and carnivore behavior.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: GENETIC CONSERVATION	
COURSE CODE	AWLM 3702
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
CO-REQUISITE	AWLM3781: WILDLIFE CONSERVATION
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
This course is designed to equip students with knowledge on population genetic and genetic diversity of species. It also aims to familiarize students with methods of genetic management of small and endangered populations	

Learning outcomes

Upon completion of the course, students should be able to:

- Measure loss of genetic diversity and inbreeding depression in populations
- Demonstrate ability for genetic management of endangered species
- Resolving taxonomic uncertainties and defining management units through genetic analysis
- Conduct a research on genetic structure of a population

Course content

Introduction to genetic conservation. Genetics and extinction. Characterizing genetic diversity in single loci and by quantitative variation. Evolution in large population: natural selection and adaptation; mutation, migration and their interactions with selection. Evolution in small populations. Maintenance of genetic diversity. Effect of population size reduction: loss of genetic diversity in small populations, inbreeding depression, population fragmentation, genetically viable populations. Resolving taxonomic uncertainties and defining management units. Genetically modified food. Genetic management of wild and captive populations.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: WILDLIFE SURVEY & MONITORING TECHNIQUES	
COURSE CODE	AWLM 3722
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
Equip students with knowledge and skills of different techniques of wildlife quantitative survey and their suitability under different environmental and management conditions	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate substantial understanding of various techniques involved in carrying out surveillance on wildlife and monitoring of wildlife behavior and movement.
- Compare suitability of different wildlife survey techniques under differing environmental conditions and purposes of the survey.
- Plan, analyze and manage a wildlife surveillance project and be able to make suitable recommendations regarding the management of wildlife.

Course content

General principles of surveys and monitoring; the purpose of surveying and monitoring; an outline of basic techniques; Bird survey and monitoring techniques (census, atlas studies, territory mapping, line transects, point counts, mist netting, capture-mark-release-recapture, response to playback, timed species count, counting nests in colonies, leks, roosts and flocks, counting different groups of birds); mammal survey and monitoring techniques (census, atlas studies, mark-recapture methods, strip and line transects, counting dung, feeding signs, footprints, calls, breeding sites, hair tubes and hair catches, bat roosts, seal colonies; accuracy and precision of counts (sources of error and bias, environmental variables).

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: HABITAT MANAGEMENT	
COURSE CODE	AWLM 3742
NQF LEVEL	7
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	AWLM3611: WILDLIFE CONSERVATION; AWLM3601: WILDLIFE MANAGEMENT
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
This course aims to develop the students' understanding, skills and attitudes regarding range and pasture management through analysis of characteristics of various Namibian range types. Concept of the carrying capacity and determination of carrying capacity of Namibian range types is also given attention.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a deep knowledge of nature and extent of rangelands in Namibia, their management challenges and their contribution to the national economy
- Analyze range ecology, succession and retrogression in the context of equilibrium and non-equilibrium environments
- Demonstrate capacity to assess range conditions, initiate and utilize range condition monitoring practices in routine range management and evaluate range management practices
- Apply various range improvement techniques like fodder diversification and introduction of cultivated pasture appropriately under diverse range conditions and circumstances

Course content

Habitat characteristic; habitat diversity, fragmentation, arrangement; changes to habitat (physical, biological, pollution); classification of plant communities; calculation plant biomass; assessing veld conditions; grazing management; bush encroachment; desertification; fire as ecological factor; determining carrying capacity (ecological, grazing and browsing); habitat enrichment and restoration

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: SYSTEMATICS OF BIRDS & MAMMALS	
COURSE CODE	AWLM 3732
NQF LEVEL	7
CONTACT HOURS	LECTURES: 4 X 1HR/WK FOR 14 WEEKS (56HRS); PRACTICALS: 3 HR/WEEK FOR 14 WEEKS (42HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	AWLM3682: ORNITHOLOGY; AWLM3602: MAMMALOLOGY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course aims to familiarize students with systematic of birds and mammals, with a special reference to southern African fauna. This course equip students with the knowledge of evaluating birds and mammals species for ecotourism, management and conservation	

Learning outcomes

Upon completion of the course, students should be able to:

- Identify southern African birds and mammals down to species level
- Demonstrate ability to identify bird and mammals spurs, nests, eggs, feeding signs etc.
- Apply knowledge on biology and ecology of bird and mammals species for their management and conservation
- Evaluate bird and mammals species for trophy hunting and ecotourism
- Develop a local collection of bird skins, feathers and skeletons

Course content

General taxonomy and nomenclature of birds and mammals. Phylogeny and origin of birds and mammals. Characteristic of avian and mammalian orders and families. Review of bird and mammals species, with special reference to southern African fauna: identification, biology and ecology of selected mammal species.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: HERPETOLOGY & TERRARIUM	
COURSE CODE	AWLM 3782
NQF LEVEL	7
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (42HRS); PRACTICALS: 1 X 3HR ALTERNATE FOR 14 WEEKS (21HRS)
NATIONAL HOURS	120
NQF CREDITS	12
PREREQUISITE	AWLM3611: WILDLIFE ECOLOGY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course introduces students to biology of reptiles and amphibians, their ecology and evolution. I also addresses the human threats to reptiles and frogs and their habitats, and snake threats to human. It is designed to equip students with a sound knowledge on southern African herpetofauna and terrarium.	

Learning outcomes

Upon completion of the course, students should be able to:

- Identify southern African reptile and frog species down to species or genus level
- Recognize threats to frogs and reptiles and apply adequate conservation measurers
- Demonstrate ability to deal with snake bites and to avoid the bites
- Apply knowledge to breed reptiles and frogs in captivity and to develop terrarium

Course content

Morphology and anatomy; ecophysiology; movements and orientation. Anuran vocal communication; communication and social behaviour. Mating systems and sexual selection. Reproduction and parental care. Life cycles. Snake bites. Phylogeny and origin of amphibians and reptiles. Characteristic of amphibian and reptile orders and families. Review of amphibian and reptile species, with special reference to southern African fauna: identification, biology and ecology of selected mammal species. Conservation of amphibians and reptiles. Terrarium: obtaining specimens, transporting and handling, enclosures, feeding, captive breeding.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: RESERACH METHODS	
COURSE CODE	ACSC 3792
NQF LEVEL	7
CONTACT HOURS	LECTURES: 3X1H FOR 14 WEEKS (42 HRS); PRACTICALS: 1X3 HR ALTERNATE WK FOR 14 WEEKS (21 HRS)
NATIONAL HOURS	120
NQF CREDITS	12
PREREQUISITE	ACSC 3692: BIOSTATISTICS
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
This course equips students with the knowledge on research methods, the types design, analysis and presentation.	

Learning outcomes

Upon successful completion of the course, students should be able to:

- Understand the concept and rationale of statistical tests, e.g. Chi-square test, regression analysis and multivariate methods
- Identify when to apply the various statistical tests, compute and interpret the results
- Perform and interpret the results of the various tests (both by hand and using statistical software packages)

Course content

INTRODUCTION/REVIEW OF BASIC STATISTICAL METHODS. COMPARISON BETWEEN NON-PARAMETRIC AND PARAMETRIC STATISTICS. NON-PARAMETRIC STATISTICS: GOODNESS OF FIT TEST, TEST OF ASSOCIATION, CHI-SQUARE TEST, PAIRED COMPARISON, WILCOXON'S TEST, RANK CORRELATION. REGRESSION AND CORRELATION. MULTIVARIATE METHODS: MULTIPLE REGRESSION, DISCRIMINANT ANALYSIS, CANONICAL ANALYSIS, MULTIDIMENSIONAL SCALING, PRINCIPAL COMPONENT ANALYSIS. INTRODUCTION TO STATISTICAL COMPUTER PACKAGES.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: FRESHWATER ICHTHYOLOGY & AQUACULTURE	
COURSE CODE	AWLM 3801
NQF LEVEL	8
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	AWLM3681: FRESHWATER ECOLOGY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The course aims to familiarize students with biology and ecology of fish. It is designed to equip students with a sound knowledge on southern African ichthyofauna and small-scaled aquaculture under southern African conditions.	

Learning outcomes

Upon completion of the course, students should be able to:

- Identify all southern African fish species down to species level
- Analyze environmental factors affecting fish distribution, abundance and reproductive rate
- Conduct research on fish diversity, dominance structure and biomass
- Develop a small-scale fish farming
- Recognize threats to fish and apply conservation measures

Course content

Morphology, anatomy and physiology. Factors affecting fish distribution. Fish behaviour. Feeding. Reproduction and growth. Migration and movements. Parasites and diseases. Traditional fishing, angling, subsistence fisheries, aquarium and ponds. Aquaculture: biological, engineering and economic factors involved in the establishment and operations of different freshwater aquaculture systems; systems and practices of aquaculture; impact of aquaculture on environment; nutrition, brood-stock management and larval.

Assessment strategies

Continuous assessment: 40% (at least two tests, practical assessments); Exam: 60% (1 x 2 hr paper)

COURSE TITLE: ENTOMOLOGY	
COURSE CODE	AWLM 3811
NQF LEVEL	8
CONTACT HOURS	LECTURES: 4 X 1HR/WK FOR 14 WEEKS (56HRS); PRACTICALS: 3 HR/WEEK FOR 14 WEEKS (42HRS)
NATIONAL HOURS	160
NQF CREDITS	16
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The course introduces students to biology, ecology and systematic of insects and arachnids, with special reference to southern African fauna. It also aims to equip students with knowledge on the ecological and economic role of insects and the methods of insect control	

Learning outcomes

Upon completion of the course, students should be able to:

- Identify insects and arachnids down to family level and ecologically and economically important to genera and species levels
- Evaluate the positive and negative role of insects and arachnids in the nature, agriculture, forestry etc.
- Develop a reference collection of arachnids and insects
- Recognize insect developmental stages, their sounds and constructions
- Apply the knowledge in insect control

Course content

Morphology and functional anatomy of insects and arachnids. Movements and locomotion (gait, jumping, swimming, burrowing, flying). Reproduction and metamorphosis. Camouflage and disruptive forms of illusion. Vocalisation: sound structure, sound function, sound structure). Insect constructions (tunnels, leaf mines, galls, paper and cotton nests, wax and silk, etc.). Insect migration. Insect societies (termites, ants, bees, wasps, etc.). Insect ecology. Role of insects and arachnids: agriculture, forestry, medicine, veterinary, food production. Pest control. Systematic of insects and arachnids, with special reference to Namibian fauna.

Assessment strategies

Continuous assessment: 50% (at least three tests, practical assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: ECONOMIC OF WILDLIFE RESOURCES	
COURSE CODE	AWLM 3821
NQF LEVEL	8
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	AWLM3601: WILDLIFE MANAGEMENT
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The course enhances the students understanding of community based natural resource management systems including institutional arrangements, conflict resolution, participatory resource monitoring and management of common resources.	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate a broad but deep understanding of rural livelihoods, community based natural resources management's institutions, power, responsibility and benefit sharing arrangements and challenges involved
- Apply appropriate skills to monitor health and exploitation of a variety of natural resources under community based natural resource management arrangements
- Analyze simple natural resource management conflicts and recommend solutions
- Conduct evaluation of community based natural resource projects using existing or self generated data or information

Course content

Typology of wildlife resources. Exploitation rates renewable resources, with emphasis on wildlife cropping. The concept of common property and free access resources. Wildlife on private and public lands. The economic of wildlife ranching. Wildlife species valuation in relation to tourists revenues; wildlife option values. Wildlife versus alternative land uses, e.g. agriculture, forestry and mining. Direct economic value of wildlife.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: ENVIRONMENTAL IMPACT ANALYSIS	
COURSE CODE	AENE 3881
NQF LEVEL	8
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	12
PREREQUISITE	AWLM3611: WILDLIFE ECOLOGY
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
To familiarize students with the process and techniques of Environmental Impact Assessment required for fulfillment of sustainable environmental development.	

Learning outcomes

Upon completion of the course, students should be able to:

- Design an Environmental Impact Assessment process into a project plan
- Apply policies in the context of monitoring and controlling project activities
- Conduct Environmental Impact Assessment on existing and new projects, prepare EIA reports and recommend mitigation measures
- Appraise available EIA techniques and methods and determine the best methods for assessing different projects and different prevailing circumstances

Course content

Definitions: impact assessment, environmental studies, environmental impact of human activities on natural resources. Impact on atmosphere, water bodies, vegetation and wildlife. Environmental considerations in physical planning. Impact identification, monitoring and mitigation. Methods of identifying impacts, monitoring environmental impacts, and types of mitigation actions. Formal Environmental Impact Assessment. Policy and framework in Namibia.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: FIELD ATTACHMENT II	
COURSE CODE	ACA 3801
NQF LEVEL	8
CONTACT HOURS	6 WEEKS
NATIONAL HOURS	60
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	1
COURSE AIMS	
The aim of this course is to expose students to practical know-how in the field under the supervision of a technical expert in order for students to come to terms with technology and limitations under a working environment.	

Learning outcomes

Upon completion of the course, students should be able to:

- Apply theoretical knowledge to analyze situations and execute appropriate actions in a work environment relevant to their training
- Execute more administrative duties at the office including permit issue, report writing, budgeting and planning, under less supervision than given in Attachment I

- Display increased ability to take more responsibility and supervise basic operations in the institution of attachment
- Initiate research programs to address problems noted during attachment
- Appraise operations of their institution of attachment and other related institutions and present findings

Course content

Students will be attached to national parks, game reserves, conservancies and other wildlife agencies and tourist boards. An attachment report and oral presentation will constitute the total assessment mark.

Assessment strategies 50% report presentation at a seminar; 50% field report. Subject to satisfactory attendance and conduct during attachment.

COURSE TITLE: ECOTOURISM MARKETING AND TRAVEL PAN DEVELOPMENT	
COURSE CODE	AWLM 3802
NQF LEVEL	8
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course introduces students to the economy of ecotourism and familiarize students with travel pan development	

Learning outcomes

Upon completion of the course, students should be able to:

- Develop a ecotourism travel pan
- Evaluate the impact of ecotourism on rural livelihood and poverty

Course content

Ecotourism marketing. Ecotourism Travel Pan Development. Ecotourism internship; impact of ecotourism on rural livelihood and poverty; enclave tourism and ecotourism.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: WILDLIFE IN AGRICULTURAL ECOSYSTEMS	
COURSE CODE	AWLM 3822
NQF LEVEL	8
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course aims at enhancing the students understanding of relationships between wildlife management and agriculture.	

Learning outcomes

Upon completion of the course, students should be able to:

- Identify major wildlife problem animals in Namibia
- Evaluate wildlife damage
- Develop appropriate methods of controlling damages from different wildlife animals
- Develop a plan to reconcile wildlife management with agriculture

Course content

Pressures facing both farmers and wildlife in agricultural ecosystems; trade-offs between food production and wildlife conservation. Wildlife in agriculture ecosystems and rural sociology.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: BIOGEOGRAPHY	
COURSE CODE	AWLM 3882
NQF LEVEL	8
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (42HRS); PRACTICALS: 1 X 3HR ALTERNATE FOR 14 WEEKS (21HRS)
NATIONAL HOURS	120
NQF CREDITS	12
PREREQUISITE	AWLM3662: GEO-INFORMATICS FOR WM
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course introduces students to biogeography, with special reference to the Afrotropical region	

Learning outcomes

Upon completion of the course, students should be able to:

- Demonstrate knowledge on characteristic faunal elements of all biogeographical regions
- Compare Afrotropical region with other biogeographical regions of the world
- Apply main biogeographical rules in Namibia and other SADC countries
- Understand climatic adaptations of wildlife species

Course content

Main concepts and rules of biogeography. Main biomes of the world, with special reference to Africa. Faunal regions and subregions of the world, with special reference to Africa. Dynamic biogeography. Geographical barriers and island biogeography. Climatic adaptations. Patterns of distributions.

Assessment strategies

Continuous assessment: 50% (at least three assessments); Exam: 50% (1 x 3 hr paper)

COURSE TITLE: DIGITAL WILDLIFE PHOTOGRAPHY	
COURSE CODE	AWLM 3841
NQF LEVEL	8
CONTACT HOURS	LECTURES: 2 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	8
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course aims to introduce students to the techniques of digital wildlife photography and software picture preparation	

Learning outcomes

Upon completion of the course, students should be able to:

- Recognize the role of wildlife photography in ecotourism
- Demonstrate ability for artistic wildlife photography
- Conduct software picture preparation
- Plan a wildlife photography exhibition

Course content

Equipment. Ethics and safety in wildlife photography. Flashing, shading and colouring. Macro photography: insects, flowers. Underwater photography. Photography in zoological and botanical gardens. Composing pictures. Tonal ranges. Panoramic pictures. Focusing and scanning. Software picture preparations.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: ENVIRONMENTAL & ECOTOURISM EDUCATION	
COURSE CODE	AENE 3842
NQF LEVEL	8
CONTACT HOURS	LECTURES: 3 X 1HR/WK FOR 14 WEEKS (28HRS); PRACTICALS: 1 X 2HR ALTERNATE FOR 14 WEEKS (14HRS)
NATIONAL HOURS	80
NQF CREDITS	12
PREREQUISITE	NONE
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
The course is designed to equip students with environmental education methods. It also aims to familiarize them with environmental awareness and ethics	

Learning outcomes

Upon completion of the course, students should be able to:

- Apply knowledge on wildlife ecology and management in primary and secondary education
- Motivate people for environmental, nature and wildlife conservation
- Conduct environmental education in media
- Plan environmental education in nature history museums, zoological gardens, national parks etc.
- Advertise issues related to wildlife conservation
- Organize environmental education for public

Course content

General principals of environmental education. Environmental awareness and ethics. Environmental educational institutions: nature history museums, zoological gardens, national parks, reserves. Methods of environmental education. Publicizing and advertizing environmental issues. Environmental education in primary and secondary schools. Environmental education in media.

Assessment strategies

Continuous assessment: 50% (at least two tests, practical assessments); Exam: 50% (1 x 2 hr paper)

COURSE TITLE: RESEARCH PROJECT	
COURSE CODE	AWLM 3810
NQF LEVEL	8
CONTACT HOURS	INDIVIDUAL STUDENT CONSULTATION FOR 28 WEEKS: EQUIVALENT TO 1 HR/WEEK
NATIONAL HOURS	160+160
NQF CREDITS	16+16
PREREQUISITE	ACSC 3792: RESEARCH METHODS
COMPULSORY/ELECTIVE	COMPULSORY
SEMESTER OFFERED	2
COURSE AIMS	
To equip students with skills needed to carry out independent research in the field of forestry including planning, designing, methodology, data analysis and result interpretation, discussion and dissemination of findings.	

Learning outcomes

Upon completion of the course, students should be able to:

- Identify researchable problems and develop research project proposal with minimum assistance
- Implement a research project; analyze data statistically, interpret results and write up, independently or with little supervision
- Demonstrate ability to make high quality presentations to a wide audience using well formulated arguments to express and support research findings

Course content

Senior undergraduate students carry out independent study of a current topic in wildlife ecology. The course include participation in meetings organized by the coordinator, work with a faculty advisor to develop a research project, formulate hypothesis, design and carry out preliminary experiments and collect data and test the hypotheses. Students will carry out independent literature 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 the Guide for Scientific Writing.

Assessment strategies

Continuous assessment: 100% (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).

L. BACHELOR OF VETERINARY MEDICINE (17BVET) – Six-year Programme

L.1 CRITERIA FOR ADMISSION

The minimum admission requirements into the Bachelor of Veterinary Medicine programme are as follows:

L.1.1 A Namibian Senior Secondary Certificate (NSSC) at NSSC-O (ordinary) or NSSC-H (higher level) with a minimum of 30 points in five subjects on the UNAM Evaluation Scale; or a recognized equivalent qualification.

In addition to the above, the following subjects and grades will be required:

- i) English with a minimum B symbol or better at NSSC Ordinary Level, or a score of 3 or better at NSSC Higher level
- ii) Biology (or Life Science) with a minimum B symbol or better at NSSC Ordinary Level, or a score of 3 or better at NSSC Higher Level
- iii) Mathematics with a minimum B symbol or better at NSSC Ordinary Level, or score of 3 or better on NSSC Higher level
- iv) Physical Science or Chemistry with a minimum B symbol or better at NSSC Ordinary Level, or a score of 3 or better at NSSC Higher Level
- v) Students with a score of C in English at NSSC Ordinary level and a minimum of 32 points on the UNAM Evaluation Scale will also be considered. Such students will be required to register for Communication and Study Skills (LCE3419) during the first semester of their first year of study.

L.1.2 Candidates with a three-year Diploma in Animal Health or Higher Diploma in Agriculture or related field with a combined average pass of 70% or higher from a recognized and accredited institution may also be granted admission to the Bachelor of Veterinary Medicine degree programme at the discretion of the Faculty of Agriculture and Natural Resources (FANR).

L.1.3 Candidates may also be admitted into the BVM programme through Mature Age provision if they meet the following conditions:

- i) They should be at least 25 years old on the first day of the academic year in which admission is sought;
 - ii) They should have passed senior secondary school education;
 - iii) They should have proof of at least five years veterinary relevant work experience;
 - iv) They should pass all papers of the prescribed Mature Age Entry tests with a minimum of 60%.
- (d) Candidates who have successfully completed the entire first year of the BSc curriculum may also be admitted into the first year of the BVM programme if they have passed all basic science modules (i.e. Biology, Mathematics, Physical Science and Chemistry) with a minimum score of 60% in each of these modules. These students will be exempted from those first year modules already passed.

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 Faculty reserves the right to interview candidates before admission.

L.2 ARTICULATION OPTIONS

This qualification will serve as an entry point to the MSc degree in Animal Science which is a related qualification.

L.3 MODE OF DELIVERY AND LOCATION

The Bachelor of Veterinary Medicine is a fulltime programme predominantly offered at the Neudamm Campus.

L.4 DURATION OF STUDY

The programme shall be completed in a minimum period of six (6) years and a maximum period of eight (8) years.

L.5 MINIMUM REQUIREMENTS FOR RE-ADMISSION INTO THE PROGRAMME

A student will not be re-admitted into the **BVM programme** if she/he has not passed at least:

- 96 credits by the end of the 1st year
- 200 credits by the end of the 2nd year
- 304 credits at the end of the 3rd year
- 384 credits at the end of the 4th year
- 480 credits at the end of the 5th year
- 576 credits at the end of the 6th year
- 676 credits at the end of the 7th year

Students who are not re-admitted into the BVM programme, may apply for transfer into other programmes in the Faculty of Agriculture and Natural Resources, provided that they meet the following minimum requirements for re-admission into the Faculty:

A student will not be re-admitted into the **faculty** if she/he has not passed at least:

- 48 credits by the end of the 1st year of which 16 must be non-UNAM core
- 120 credits by the end of the 2nd year
- 224 credits at the end of the 3rd year
- 328 credits at the end of the 4th year
- 432 credits at the end of the 5th year

L.6 ADVANCEMENT AND PROGRESSION RULES

L.6.1 To advance to the second year of the BVM programme a student must have passed at least 120 credits.

A student who has passed at least 96 (but less than 120) first year credits, will be allowed to register for a maximum of 48 second year credits (in addition to the failed modules) provided that the relevant pre-requisites have been passed.

L.6.2 To advance to the third year of the BVM programme a student must have passed all first year modules as well as at least 128 second year credits.

A student who has passed all first year modules and at least 64 (but less than 128) second year credits, will be allowed to register for a maximum of 48 third year credits (in addition to the failed modules) provided that the relevant pre-requisites have been passed.

L.6.3 To advance to the fourth year of the BVM programme a student must have passed all first, second and third year modules.

A student who did not pass all first and second year modules and / or passed less than 112 third year credits, will have to repeat all failed modules and will not be allowed to enroll for any fourth year modules.

If a student has passed all first and second year modules as well as at least 112 third year credits, such a student will be allowed to enroll for a maximum of 40 fourth year credits (in addition to the failed modules), excluding all clinical studies modules, provided that the relevant pre-requisites have been passed.

L.6.4 To advance to the fifth year of the BVM programme a student must have passed all first, second, third and fourth year modules.

A student who did not pass all first, second and third year modules and / or passed less than 96 fourth year credits, will have to repeat all failed modules and will not be allowed to enroll for any fifth year modules.

If a student has passed all first, second and third year modules as well as at least 96 fourth year credits, such a student will be allowed to enroll for a maximum of 20 fifth year credits (in addition to the failed modules), excluding clinical studies modules, provided that the relevant pre-requisites have been passed.

L.6.5 To advance to the final year of the BVM programme a student must have passed all first, second, third, fourth and fifth year modules. A student will not be allowed to carry any modules over to the sixth year of study as this involves clinical rotations.

L.6.6 A student will not be allowed to repeat the sixth year of study more than once.

No student will be allowed to register for a module for which the approved pre-requisite was not met.

L.7 PROGRAMME SCHEDULE

YEAR 1 (136 CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
PHY 3501	Physics for Life Science	5	02/28	21	8		
LEA 3519	English for Academic Purposes	5	04/56		16		
CSI 3580	Contemporary Social Issues	5	01/14		4		
BLG3511	Introduction to Biology	5	04/56	42	16		
MAT3511	Basic Mathematics	5	04/56	28	16		
BVM 3501	Veterinary Anatomy, Histology and Embryology I	5	05/70		8		
Total Semester 1 credits:					68		

Semester 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3552	Veterinary Physiology I	5	04/56	42	16		
BVM 3572	Veterinary Anatomy, Histology and Embryology II	5	07/98		16		
CLC 3509	Computer Literacy	5	02/28		8		
BVM 3519	Veterinary Biochemistry	5	04/56	21	16		
BVM 3542	Veterinary Genetics	5	02/28	21	8		
CSI 3580	Contemporary Social Issues	5	01/14		4		
Total Semester 2 credits:					68		

YEAR 2 (144 CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3619	Animal Ethology, Welfare and Health	6	04/56	42	16		
BVM 3601	Introduction to Veterinary Microbiology	6	02/28	21	8	BLG 3511	
BVM 3631	Applied Comparative Anatomy I	6	07/98		16	BVM 3501, BVM 3572	
BVM 3611	Veterinary Physiology II	6	04/56	42	16	BVM 3552	
BVM 3651	Veterinary Parasitology I	6	04/56	42	16	BLG 3511	
Total Semester 1 credits:					72		

Semester 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3602	Veterinary Immunology and Vaccinology	6	02/28	21	8		BVM 3601
BVM 3632	Applied Comparative Anatomy II	6	7/98		16	BVM 3501, BVM 3572	
BVM 3652	Veterinary Parasitology II	6	04/56	42	16	BLG 3511	
BVM 3612	Animal Nutrition and Pasture Science	6	04/56	21	16	BVM 3519	
BVM 3622	Animal Production	6	02/28	21	8		
BVM 3642	Biometry	6	02/28	14	8	MAT 3511	
BVM 3609	Field Attachment I: Production Animal Farm	6	3 weeks				
Total Semester 2 credits:					72		

YEAR 3 (144 CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3701	Clinical Diagnostics	7	02/28	21	8	BVM 3611, BVM 3501, BVM 3572	
BVM 3721	Herd Health Management and Economics	7	02/28	21	8	BVM 3619, BVM 3622, BVM 3602	
BVM 3711	Infectious Diseases and Microbiology I	7	04/56	42	16	BVM 3601	
BVM 3731	Veterinary Pharmacology and Toxicology I	7	04/56	21	16	BVM 3651, BVM 3652, BVM 3611, BVM 3519	
BVM 3741	Ethno-Veterinary Medicine	7	02/28	21	8		
BVM 3751	Veterinary Epidemiology I	7	04/56	28	16	BVM 3642	
Total Semester 1 credits:					72		

Semester 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3772	General Surgery, Anaesthesiology & Diagnostic Imaging	7	04/56	42	16	BVM 3611, BVM 3501, BVM 3572	BVM 3701, BVM 3731
BVM 3752	General Pathology	7	04/56	42	16	BVM 3501, BVM 3572, BVM 3651, BVM 3652, BVM 3602	BVM 3701
BVM 3732	Veterinary Pharmacology and Toxicology II	7	04/56	21	16	BVM 3651, BVM 3652, BVM 3611, BVM 3519	BVM 3731

BVM 3712	Infectious Diseases and Microbiology II	7	04/ 56	42	16	BVM 3601	BVM 3711
BVM 3762	Veterinary Epidemiology II	7	02/ 28	21	8	BVM 3642	BVM 3751
BVM 3709	Field Attachment II: Laboratory/Game Reserves	7	3 weeks				
Total Semester 2 credits:					72		

YEAR 4 (120CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQ F LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVC 3801	Fish and Bee Medicine	8	02/ 28	2 1	8		
BVC 3841	Systemic Pathology I	8	02/ 28	2 1	8	BVM 3752	
BVC 3821	Wildlife Clinical Studies	8	02/ 28	2 1	8		
BVM 3811	Veterinary Public Health I	8	04/ 56	2 1	16	BVM 3752, BVM 3651, BVM 3652 BVM 3711, BVM 3712	
BVC 3831	Porcine & Poultry Clinical Studies, Health and Production	8	07/98		16		
BVM 3880	Veterinary Professional Skills	8	01/ 14	0	4		
Total Semester 1 credits:					60		

Semester 2

MODULE CODE	MODULE TITLE	NQ F LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3812	Veterinary Public Health II	8	04/ 56	4 2	16	BVM 3752, BVM 3651, BVM 3652 BVM 3711, BVM 3712	BVM 3811
BVC 3812	Small Animal Clinical Studies I	8	7/98		16		
BVM 3802	Systemic Pathology II	8	02/ 28	2 1	8	BVM 3752	
BVC 3832	Ruminant Clinical Studies, Health and Production I	8	07/98		16		
BVM 3880	Veterinary Professional Skills	8	01/ 14	0	4		

BVM 3809	Field Attachment III: Private/State Vet Clinic	8	3 weeks			
Total Semester 2 credits:				60		

YEAR 5 (132CREDITS)

Semester 1

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVC 3811	Small Animal Clinical Studies II	8	7/98		16		
BVC 3819	Ruminant Clinical Studies, Health and Production II	8	7/98		16		
BVC 3851	Equine Clinical Studies	8	7/98		16		
BVC 3871	Theriogenology, Gynaecology and Obstetrics I	8	7/98		16		
Total Semester 1 credits:					64		

Semester 2

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	PRE-REQUISITES	CO-REQUISITES
BVM 3822	Policy, Legislation and Jurisprudence	8	02/28		8		
BVC 3872	Ruminant Clinical Studies, Health & Prod. III	8	7/98		16		BVC 3831
BVC 3839	Small Animal Clinical Studies III	8	7/98		16		BVC 3811
BVC 3852	Theriogenology, Gynaecology & Obstetrics II	8	7/98		16		
BVM 3882	Research Methodology	8	03/42		12	BVM 3751, BVM 3762	
Total Semester 2 credits:					68		

YEAR 6 (120 CREDITS)

Semesters 1 & 2

MODULE CODE	MODULE TITLE	NQF LEVEL	CREDITS	PRE-REQUISITES
BVC 3890	CLINICAL ROTATION	8	88	
BVM 3810	RESEARCH PROJECT	8	32	BVM 3882

The Sixth year of this programme will entail an intensive clinical rotation for 45 weeks where each student will be exposed to hands on experiential process under supervision of trained registered professional veterinarians and other experts in their fields to develop their practical skills and attain their "Day One Competencies" as recommended by the OIE and NVC. The Rotation will commence on the 1st of December of each year after successful completion of the fifth year and end on the 15th of November of the following year.

TOTAL PROGRAMME CREDITS: 796

FIRST YEAR MODULES

Module Title:	PHYSICS FOR LIFE SCIENCES
Module Code:	PHY 3501
NQF Level:	5
Notional Hours:	80
Contact hours:	Lectures: 2 x 1hr lectures / week for 14 weeks (28 hrs) Practicals: 1 x 3hr practical / alternate week for 14 weeks (21 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1

Module Aim:

This module aims to introduce life science students (such as agricultural, biological, and environmental science students) to fundamental physics concepts and its applications, especially in mechanics, that will be useful to them in their undergraduate studies and respective careers. The module exposes the student to a wide range of applications involving problem-solving in life science related fields. The module is non-calculus based and largely aims to build a stimulating conceptual-based understanding of the basic laws of physics.

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- Employ units correctly, do unit conversions, use significant figures and take accurate measurements with different measuring instruments such as micrometers, and Vernier callipers.
- Finding of the resultant of different vectors by component method and by the geometrical addition method.
- Apply Newton's laws of motion to solve simple mechanical problems.
- Discuss linear and circular motions and compute the involve quantities, such as the radius of an orbital motion.
- Explain and use the conditions for bodies in mechanical equilibrium.
- Discuss how to solve problems on work, energy and power.
- Explain and apply the law of conservation of momentum and distinguish between elastic and inelastic collisions.
- Apply Newton's law of universal gravitation and discuss Kepler's laws of planetary motion.

Module Contents:

Physics and Measurement: units and unit conversion, SI-unit system and non-metric systems, significant figures and scientific notation.

Vectors: vectors and scalars, operations with vectors in two dimensions, component method of vector operations

Motion 1 and 2 Dimensions: average velocity; acceleration; motion at constant acceleration; freely falling bodies; Projectiles; uniform circular motion

Newton's Laws of Motion: force and weight, Newton's first, second and third laws, applications of Newton's laws, free-body diagrams, friction, motion on inclined planes; centripetal force, banking of curves.

Gravitation: Newton's law of universal gravitation; gravity near the Earth's surface, satellites; Kepler's first, second and third laws.

Work, Energy and Power: work done by a constant force, kinetic energy, work-energy theorem, potential energy, conservation of mechanical energy, power.

Momentum: conservation of momentum; collisions in one dimension; impulse; conservation of energy and momentum in collisions; elastic and inelastic collisions in one dimension.

Assessment Strategies

- Continuous assessment (tests, practicals and assignments): 50%.
- Written examination (1 x 2-hour paper): 50%
- Minimum mark to pass the module: 50%
- The tests and examination will cover the module content.

Module Title:	ENGLISH FOR ACADEMIC PURPOSES
Module Code:	LEA 3519
NQF Level:	5
Notional Hours:	160
Contact hours:	Lectures: 4 x 1hr lectures / week for 14 weeks (56 hrs)

NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1

Module Aim:

To enable students to use English effectively in the academic contexts they will encounter in their studies. The main emphasis is on improving students' confidence and competence in using English in these contexts. As far as possible, the subject will address the specific language needs of students' ability levels and subject specialisms.

Learning outcomes:

Upon completion of this module, students should be able to:

- Write effectively and accurately within an academic context;
- Follow the conventions of academic writing;
- Read critically and effectively;
- Access academic journals and other sources of information;
- Listen to academic lectures and taking notes;
- participate in academic seminars and discussions;
- Deliver presentations within their area of interest and beyond.

Module Contents:

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 module 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.

Assessment Strategies

Continuous Assessment: minimum 2 tests, 2 assignments, and practical reports (40%), and an examination consisting of a 2-hour paper (60%).

Module Title:	CONTEMPORARY SOCIAL ISSUES
Module Code:	CSI 3580
NQF Level:	5
Notional Hours:	80
Contact hours:	Lectures: 1 x 1hr lectures /week for 28 weeks (28 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1 and 2

Module Aim:

The module raises awareness on the need for a personal, National and global ethics.

Learning outcomes:

Upon completion of this module, students should be able to:

- Discuss regional, national, and global community issues
- Discuss the transfer of up to date regional and national issues to their community.

Module Contents:

The module raises awareness on the need for a personal, national and global ethics. The main objective of the module is to help students reflect on the social moral issues: to discover themselves in a learner-centred, contextual, religious and life related setting. It also stimulates students for critical thinking and help them to appreciate their values, standards and attitudes.

Furthermore it orientates students with regards to the epidemiology of HIV/AIDS; the prevalence of the disease in Namibia, Africa and Internationally. It also informs students on the psycho social and environmental factors that contribute to the spread of the disease, the impact of HIV/AIDS on their individual lives, family and communities at large.

The unit further seeks to enhance HIV/AIDS preventive skills among students by means of paradigm shift and behaviour change and also to impart general introductory knowledge on gender, to make students aware, as well as sensitize them towards gender issues and how they affect our society, Sub-Region and continent at large.

Assessment Strategies

Continuous Assessment: minimum 2 tests, 2 assignments, and practical reports (100% Continuous assessment)

Module title:	INTRODUCTION TO BIOLOGY
Module Code:	BLG 3511
NQF level:	5
Notional Hours:	160
Contact hours:	Lectures: 1x 4 hrs / week for 14 weeks (56hrs) Practicals: 1x 3 hrs /week for 14 weeks (42 hrs)
Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1

Module Aim:

This Module aims to introduce students to Biological Sciences considering the organization of life as well as the chemical basis of life.

Learning Outcomes:

Upon successful completion of this module, students should be able to:

- describe the levels of organization of life, the characteristics of life, the unity and diversity of life, the function of cellular organelles and the cytoskeleton and its function
- explain the scientific method and the difference between prokaryotic and eukaryotic cells
- write a scientific report
- perform basic measurements of length, mass, temperature and basic statistical measures
- use a microscope properly as well as identify parts of a microscope and explain terms used in microscopy
- draw scientifically any observation and calculate magnification of drawings
- describe the contributions of Linnaeus, Bentham & Hooker, Engle r& Prantl and Bessey to classification
- explain the differences and similarities between artificial, natural and phylogenetic classification systems as well as the advantages and disadvantages of each system with examples
- interpret and construct a cladogram
- explain the differences between the five kingdom and the 3 domain classification systems
- compare concepts such as homology and analogy, diploblastic and triploblastic body cavities, radial and bilateral body symmetry, protostome and deuterostome development
- explain bonding and uses of isotopes, describe atoms, elements, molecules etc, defining isotopes
- describe the chemical nature of water and properties & functions of acids, bases and salts, calculating concentrations in solutions, explain the properties of water and how water can moderate temperature
- explain the structure and formation of proteins, nucleic acids, lipids etc
- describe the ultrastructure of plasma membrane and the process of exocytosis and endocytosis, distinguish between different solutions as well as diffusion, osmosis active transport and facilitated diffusion, explain the process of plasmolysis,
- define cell communication, describe long and short distance communication, explain the 3 stages of signaling, illustrate various ways of transductions, describe functions of hormones, chemicals etc in cell communication
- define meiosis and mitosis, describe the two processes, distinguish between the two, explain the significance of each
- define genes, alleles, mutations, heterozygous and homozygous, describe the Mendelian Laws of inheritance and the chromosomal law of inheritance, use Punnet squares to determine genotypes, explain some genetic diseases, gene therapy, sex linkage and gene linkage

Module Contents:

This is an introductory biology Course that is designed to allow students to acquire a strong foundation into the biological sciences. The following topics will be covered: Basic techniques in biology such as microscopy, drawing, the scientific method and writing of scientific reports will be covered; Introduction to systems of classification (taxonomy and binomial nomenclature, including the five kingdoms and the three domain system); Organization of life (levels of organization): Molecule, organelle, cell, tissue, organ, organ system, organism, population, community, ecosystem (including the scales in ecology), biosphere; Chemical basis of life: carbohydrates, proteins, nucleic acids, lipids and fats, water; Cell biology: prokaryotic and eukaryotic cells, ultra-structure of plant and animal cells, cytoskeleton, membrane structure and function, cell cycle, cell division; Genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance; Early theories on evolution, Evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. (Concepts such as homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered)

Emphasis will be focused on the following topics:

Cell structure

Chemistry of Life – Atoms, Interactions between atoms, chemical bonding

Water and the Biological System – Properties of water, water in biochemical reactions, acids, bases and salts

Carbon molecular diversity and organic molecules – carbon, lipids, amino acids & proteins, nucleotides & nucleic acids

Membrane structure and function – interactions with the environment, diffusion & osmosis

Introduction to cell communication – 3 stages of cell signalling & transduction

Concepts of early development of organisms & evolution–development of body structure, body cavities, principles of evolution, evidence for sources of variations

Mitosis and meiosis – structures of chromosomes, cell cycle, process of meiosis, meiosis and genetic variation

Introduction to Mendelian Genetics – Mendel's Laws, chromosomes and inheritance, Mendelian inheritance in humans, chromosomal differences

Assessment Strategies

Continuous assessment 40% (60 % - minimum of 2 tests and 40% - at least 10 graded practical-reports)

Examination: 60% (1 x 3 hour examination paper)

Module Title:	BASIC MATHEMATICS
Module Code:	MAT 3511
NQF Level:	5
Notional Hours:	160
Contact hours:	Lectures: 4 x 1hr / week for 14 weeks (56 hrs) Tutorials: 1 x 2hr / week for 14 weeks (28hrs)
NQF Credits:	16
Pre-requisites:	NSSC Mathematics
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1

Module Aim:

This Module aims to bridge the gap between school mathematics and higher (tertiary) mathematics.

The module focuses on the understanding of the basic principles of Mathematics where students will gain a broad and fundamental understanding of Mathematics

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- describe how to find the intersection and the union of two sets as well as the complement of a subset of a set
- discuss how to decompose a fraction into partial fractions
- simplify and factorize algebraic expressions and solve linear and quadratic equations and inequalities
- find partial sums and the sums of geometric and arithmetic sequences expand algebraic expressions of the form $(a+b)^n$ for any natural number n .

Module Contents:

The module will cover the following chapters:

Sets: What is a set? Set notation, equality of sets, subsets, characterization of equality via the subset relation, empty set, power sets, Venn diagrams, intersection, union, complement, de Morgan's laws, set difference, symmetric difference, proofs of simple results on set equality.

Standard examples of sets: natural numbers, integers, rationals, real numbers, absolute value, intervals in \mathbb{R} and a bit about cardinality of sets (examples of finite, infinite, countable, uncountable sets).

Algebraic expressions: Simplification, expansion, factorization, polynomials, remainder and factor theorem, quadratic polynomial, binomial expansions, Pascal's triangle and the Binomial Theorem. Rational expressions, partial fractions will also be discussed.

Equations and inequalities: Linear equations in one-variable, simultaneous linear equations, quadratic equations, simultaneous non-linear equations, Linear inequalities, non-linear inequalities.

Trigonometry: Trigonometric ratios, angle orientation in the xy -plane, graphs of trigonometric functions, trigonometric identities, justifying (proving) equality of relatively simple trigonometric expression, sum/difference, double angle, half angle and sum to product formulas.

Sequences: Definition, notation, obtaining the general term in sequences, arithmetic sequences, geometric sequences, and recursively defined sequences.

Assessment Strategies

Course Assessment: Continuous Assessment: 50% (minimum of 3 class tests). Examination: 50% (1 x 3-hour paper).

Module Requirements:

University of Namibia regulations pertaining to class attendance will apply.

Equipment to be bought: Calculator

Additional Costs: None

Next scheduled review: 2020

Module Title:	VETERINARY ANATOMY, HISTOLOGY AND EMBRYOLOGY I
Module Code:	BVM 3501
NQF Level:	5
Notional Hour:	80
Contact Hours:	5 hrs of integrated theory and practicals / week for 14 weeks (70 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1`

Module Aims:

This module aims to provide an overview of the structural and functional anatomy of domestic animals commonly encountered in veterinary medicine. Emphasis is placed on the parts (gross anatomy) as well as histology of the relevant system(s) of the animal body and the associated medical terminology using one of the following as the model animal (canine, bovine, ovine, equine, porcine, caprine). Topics: Osteology, Arthrology; macroscopic (gross), microscopic (histological) and developmental anatomy (embryology) of bone and cartilage.

Learning Outcomes:

Upon completion of this module, students should be able to:

- define terminology associated with each system
- name and locate the gross anatomical parts using diagrams, skeletons, or anatomical models
- identify and name the structures associated with the skeletal system visible on radiographic images
- discuss the principle anatomical similarities and differences among domestic animal species

Module Content:

The module will focus on general (introductory) and systemic; macroscopic (gross), microscopic (histological) and developmental (embryology) anatomy of the skeletal system of the model animal. Histological and embryological aspects of the skeletal system will be completed. The gross anatomical, histological and developmental aspects of the skeletal system would be tackled in an integrated way and in a systematic way.

Assessment Strategies:

Continuous Assessment: Minimum 2 assessments and at least 5 marked practical assessments

Examination: 1 x 2hr practical (50%) and 1 x 2hr theory paper (50%)

Module Title:	VETERINARY PHYSIOLOGY I
Module Code:	BVM 3552
NQF Level:	5
Notional Hours:	160
Contact Hours:	Lectures: 4 x 1hr / week for 14 weeks (56 hrs) Practicals: 1 x 3hr practical / week for 14 weeks (42hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide students with a general understanding of animal physiology of species of veterinary importance in Namibia. Veterinary Physiology I will focus on homeostasis and organ integration, physiology of the nervous system and sense organs, physiology of movement, physiology of the endocrine system, reproductive system and the physiology of cardiovascular system as they apply to an animal's ability to maintain homeostasis. Physiological topics will be examined from a comparative and integrative perspective. The practical part of this module will emphasize on laboratory experiments, experimental techniques, and data collection of physiological variables.

Learning Outcomes:

Upon completion of this module, students should be able to:

- explain the concept of homeostasis, regulatory mechanism including set point, negative and positive feedback loops, and compensatory responses.
- describe the various physiological organ-systems and their importance to the integrative functions of the animal body.
- describe structural and functional organization of the nervous system, including the central and peripheral nervous systems, and the autonomic nervous system,
- explain principles and applications of sensory physiology
- discuss intracellular and extracellular communication systems
- explain the structure and function of skeletal muscle, including excitation-contraction coupling, sliding filament mechanism, force generation, and isometric versus isotonic contractions.
- explain the structure and functions of smooth muscle, including excitation-contraction coupling in smooth muscle.
- Describe the structure and functions of the male and female reproductive systems including species differences where relevant
- explain the structure and functions of the cardiovascular system, including the mechanical and electrical properties of cardiac muscle function.
- discuss the excitation-contraction coupling in cardiac muscle.
- explain the reflex regulation of blood pressure.
- Describe the normal composition of blood including the functions of each type of cell
- explain the functions of the endocrine system with focus on classic endocrine glands, including the hypothalamus and the pituitary glands, thyroid and parathyroid glands, adrenal glands, endocrine pancreas and mammary gland.

Module Content:

The module will cover the following topics:

General introduction - organ systems: overview and integration, concept of feedback loop and Homeostasis and body system integration; physiology of nervous system and muscle – Organization, structures and functions of the nervous system, the central and peripheral nervous systems, the autonomic nervous system, somatic nervous system, neurophysiology, the somatosensory system: olfaction, taste, hearing and Equilibrium, vision; Physiology of movement: muscles, types of muscles, sliding filament theory of muscle contraction, excitation-contraction coupling, locomotion and movement coordination; physiology of the endocrine system, endocrine glands functions of the endocrine system, systemic effects of main hormones, the renin-angiotensin-system; endocrine versus nervous system regulation; reproductive system: genital glands, oestrus cycle, mammary gland; physiology of cardiovascular system; overview of cardiovascular function; blood: composition, properties and function of blood, blood circulation, physiology of lymph, medullar and synovial liquids, cardiac muscle, mechanism of cardiac contraction, heart beat and cardiac cycle, regulation of blood pressure and heart activity.

Assessment Strategies:

Continuous Assessment: minimum 3 assessments and at least 5 marked practical assessments

Examination: 1 x 3hr paper

Module Title:	VETERINARY ANATOMY, HISTOLOGY AND EMBRYOLOGY II
Module Code:	BVM 3572
NQF Level:	5
Notional Hours:	160
Contact Hours:	7 hours of integrated theory and practicals/ week for 14 weeks (98 hrs)
NQF Credits:	16
Pre-requisites:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide an overview of the structural and functional anatomy of domestic animals commonly encountered in veterinary medicine in an integrated method. Emphasis is placed on anatomical structures (gross anatomy) as well as histology of the systems of the animal body and the associated medical terminology using one of the following as the model animal (canine, bovine, ovine, equine, porcine, caprine). Topics: General (introductory) and systemic; macroscopic (gross), microscopic (histological) and developmental anatomy (embryology) of muscular, digestive, cardiovascular, respiratory, urinary and reproductive, nervous, haemopoietic, lymphoreticular, endocrine and integumentary systems as well as sensory organs.

Learning Outcomes:

Upon completion of this module, students should be able to:

- define terminology associated with each system
- name and locate the gross anatomical parts of the different systems using diagrams, dissected specimens, skeletons, or anatomical models

- demonstrate dissection skills of organs and systems
- identify the origin and insertion of muscles, and the innervation and blood supply of each organ and tissue
- recognize microscopic features of relevant tissues
- discuss macroscopic development of each of the organs

Module Content:

The module will focus on general (introductory) and systemic macroscopic (gross), microscopic (histological) and developmental (embryology) anatomy of the muscular, digestive, cardiopulmonary, urogenital (urinary and reproductive) nervous, haemopoietic, lymphoreticular, endocrine and integumentary systems as well as sensory organs of the model animal species. The gross anatomical, histological and developmental aspects of these systems will be covered using an integrated approach for each topic.

Assessment Strategies:

Continuous assessment: Minimum 2 theory assessments and at least 7 marked practical assessments
 Examination: 1 x 2hr practical examination (50%) and 1 x 3hr theory paper (50%).

Module Title:	COMPUTER LITERACY
Module Code:	CLC 3509
NQF Level:	5
Notional Hours:	80
Contact hours:	Lectures: 1 x 2hr / week for 14 weeks (28 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	2

Module Aim:

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.

Learning Outcomes:

Upon successful completion of this module, students should be able to:

- Define technology and its role in today's society
- Identify and describe the purposes of various computer hardware components
- Explain the role of operating systems
- Describe the purposes of databases
- Explain how databases work
- Describe how computer networks are organized and how they work
- Explain the purpose of a computer server

Module Contents:

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, and 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 work book.

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.

Assessment Strategies

Continuous Assessment: minimum 2 tests, 2 assignments, and practical reports (40%), and an examination consisting of a 2-hour paper (60%).

Module Title:	VETERINARY BIOCHEMISTRY
Module Code:	BVM 3519
NQF Level:	5
Notional Hours:	160

Contact Hours:	Lectures: 4 x 1hr / week for 14 weeks (56 hrs) Practicals: 1 x 3hr / alternate week for 14 weeks (21hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

The module aims to acquaint students with principles of Biochemistry in the context of veterinary medicine.

Learning Outcomes:

Upon completion of this module, students should be able to:

- explain the role of enzymes in biological systems and discuss the factors affecting enzyme activity
- discuss catabolic biochemical pathways that take place in living tissues to provide energy in the form of ATP, such as glycolysis, TCA cycle, and the Cori cycle
- discuss anabolic biochemical pathways such as the pentose phosphate pathway (PPP) and gluconeogenesis
- apply the laws of thermodynamics
- Explain the metabolism, its regulation and importance to the physiological condition of an organism
- Explain the biochemical basis of selected metabolic diseases in animals

Module Content:

The module will focus on the following topics:

Enzymology: Enzymes as organic catalysts; enzyme nomenclature; factors affecting activities of enzymes; enzyme kinetics - the Michaelis-Menten equation; the Line weaver-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 metabolism of lactic acid, 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, malonyl CoA); integration of carbohydrate and fat metabolism; amino acids and protein metabolism; urea cycle; the Cori cycle; pentose phosphate pathway. Metabolic diseases especially those related to the digestion in ruminants will also be discussed.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 practical assessments

Examination: 1 x 3hr

Module Title:	VETERINARY GENETICS
Module Code:	BVM 3542
NQF Level:	5
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr / week for 14 weeks (28 hrs) Practicals: 1 x 3hr / alternate week for 14 weeks (21hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide an overview of introductory aspects of genetics that are relevant to veterinarians by covering a variety of topics that include chromosomal abnormalities, heritability, inbreeding and control of inherited diseases.

Learning Outcomes:

Upon completion of this module, students should be able to:

- describe the single gene and chromosomal disorders
- discuss selection and mutation and the selection and crossing of genes
- apply the Hardy-Weinberg law in analysing population genetics
- discuss familial and inherited disorders in selected farm animals
- discuss the genetic and environmental control of inherited diseases
- discuss the impact of inbreeding and cross breeding in production animals
- discuss the heritability; breed history and structure of different production animal breeds

- discuss selection, crossing and inbreeding
- explain the genetic variations in different animals
- explain the basis of genetic resistance to animal diseases
- discuss the importance of conservation genetics
- discuss how genetics influence coat colours of animals
- discuss genetic biotechnology
- discuss clinical genetics
- describe advanced techniques in applied genetics

Module Content:

This module introduces and presents principles and methods used in the study of veterinary genetics. The emphasis throughout is on application of concepts to solve problems. It covers the creation and use of genome assemblies and genetic maps; single-locus traits and disorders; chromosomal abnormalities; non-Mendelian familial disorders; immune-genetics; parentage tests; conservation genetics; Genetic basis of resistance to diseases; genetic and environmental control of inherited diseases; relationship and inbreeding; heritability; breed history and structure; selection and crossing; genetics of coat colours; genetic biotechnology; clinical genetics; applied population genetics, introduction to advanced genetic techniques in applied genetics.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 3 marked practical assessment
Examination: 1 x 2 hr paper

SECOND YEAR MODULES

Module Title:	ANIMAL ETHOLOGY, WELFARE and HEALTH
Module Code:	BVM 3619
NQF Level:	6
Notional Hours:	160
Contact hours:	Lectures: 4 x 1hr / week for 14 weeks (56 hrs) Practicals: 1 x 3hr / week for 14 weeks (42hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims to highlight behavioural responses of animals to stressors related to husbandry, housing, transport, slaughter, training and performance. Current animal welfare matters according to OIE recommendations and legislation on animal welfare in Namibia will be discussed. This module further aims to introduce students to the basic principles of animal health and disease in companion and production animals, with special emphasis on management strategies used in Namibia..

Learning outcomes:

Upon completion of this module, the student should be able to:

- describe mechanical restraint and handling of selected domestic animals
- describe the flight zone and point of balance for low stress handling of cattle, sheep, and pigs
- define animal ethology and differentiate between behavioural studies
- differentiate and describe the major types of behaviour in domestic animals
- describe current animal welfare considerations as stipulated in the OIE recommendations, including the Five Freedoms
- discuss the physiological and behavioural factors that assist in assessing welfare of animal
- discuss the welfare of working animals
- consistently display safe and systematic competence in animal handling
- discuss principles and ethical requirements for animal slaughter and euthanasia
- discuss animal protection and welfare legislation in Namibia
- recognise and differentiate between healthy and unhealthy animals
- recognize basic symptoms of disease in unhealthy animals
- explain how the disease causative agent, the environment and host interact to cause a disease
- explain the relative importance and control of diseases with economic and trade implications
- discuss principles of treatment, management, control and eradication of animal disease
- describe animal disease control strategies in Namibia
- describe the impact of predation in livestock in Namibia with possible prevention strategies
- discuss the principles of sample collection as a tool for diagnosis
- discuss the importance of the livestock identification and traceability system in Namibia (NamLITS)

- explain the roles of various national, regional and international standard setting bodies

Module Contents:

Animal Ethology: The module is deals with the behavioural adaptations of domestic animals to their environment as well as appropriate animal restraining and handling practises. The module will cover a brief history of the study of animal ethology, the interpretation of animal behaviour, and the major types of behaviour in domestic animals.

Animal Welfare: The module covers different aspects of animal welfare science with reference to the Five Freedoms and OIE animal welfare recommendations. The behavioural factors that affect the welfare of animal will be highlighted. Animal husbandry issues such as housing, handling, and basic aspects of nutrition of animals will be discussed, with relevance to their impact on the welfare of animals. The module will also focus on the introduction to animal welfare ethics, influence of transport and the marketplace on animal welfare, ethics and principles of euthanasia. The current relevant Namibian animal protection and welfare legislation and the role of the welfare organisations will be assessed and evaluated. The module will further highlight the role veterinarians play in delivering services that enhance the welfare of animals.

Animal Health: The module will introduce students to the concepts of animal health and disease. The causes of important infectious and non-infectious diseases and disorders with emphasis on domestic animals will be discussed. Healthy animals will be differentiated from unhealthy animals. The principles of keeping animals in different physiological states healthy by using a range of management and interventional strategies will be discussed. Emphasis will also be placed on the animal disease control strategies in Namibia, including the role of Namibia livestock identification and traceability system (NamLITS) in the country.

Assessment Strategies

Continuous Assessment: minimum 3 theory assessments and at least 5 marked practical assessments

Examination: 1 x 3hr paper

Module Title:	INTRODUCTION TO VETERINARY MICROBIOLOGY
Module Code:	BVM 3601
NQF Level:	6
Notional Hour:	80
Contact Hours:	Lectures: 2 x 1hr / week for 14 weeks (28 hrs) Practicals: 1 x 3hr / alternate week for 14 weeks (21hrs)
NQF Credits:	8
Pre-requisites:	BLG 3511 Introduction to Biology
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims to introduce students to microorganisms including bacteria, fungi, and viruses. It further aims to develop the necessarily skills in the safe handling of microbial pathogens.

Learning Outcomes:

Upon completion of this module, students should be able to:

- Discuss the main milestones and scientists in the history of microbiology
- describe the structure and disease producing mechanisms of microbial pathogens
- discuss the mode of multiplication, nutrition, growth, genetics, classification and nomenclature of microbial pathogens
- outline the basic processes involved in in the pathogenesis of bacterial, fungal and viral diseases
- explain the mechanism of action of antimicrobial agents and how bacteria (and other microorganisms) may resist their action
- handle clinical samples safely in a laboratory and carry out elementary microbiological procedures
- discuss the management and control of diseases of public health importance
- perform basic relevant laboratory diagnostic tests
- discuss the importance of microorganisms in human and animal health and their application in industry and impact on ecology

Module Content:

The module will cover the following:

General microbiology and bacteriology: Introduction and history of microbiology, morphology, structure, growth and nutrition of bacteria, classification and nomenclature of bacteria, microbial ecology, control of microorganisms, pathogenicity, virulence and infection; endotoxins and exotoxins; bacterial genetics, plasmids and antibiotic resistance.

Mycology: Introduction, morphology, growth, nutrition, reproduction in fungi, classification of fungi.

Virology: Introduction to viruses, general properties, replication, cultivation and purification of viruses, cell-virus interactions, viral genetics and interferon.

Diagnostic microbiology: Equipment, sterilization, disinfection and asepsis, staining, bacterial motility, preparation of culture media, aerobic and anaerobic cultivation, isolation of bacteria in pure culture, morphological and cultural characteristics, biochemical characteristics, antibiogram and slide culture technique for fungus.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 5 marked practical assessment

Examination: 1 x 2hr paper

Module Title:	APPLIED COMPARATIVE ANATOMY I
Module Code:	BVM 3631
NQF Level:	6
Notional Hours:	160
Contact Hours:	7 hours of integrated theory and practicals/ week for 14 weeks (98 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3501 Veterinary Anatomy, Histology & Embryology I BVM 3572 Veterinary Anatomy, Histology & Embryology II
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

The module aims to cover applied and comparative anatomy of canines, felines, ruminants, equines and pigs. Applications to local anaesthesia and surgery, as well as other therapeutic and diagnostic procedures in the head and neck, forelimb and hind limb.

Learning Outcomes:

Upon completion of this module, students should be able to:

- correctly identify and compare similarities and differences of important anatomical features of domestic animals using live and preserved specimens, diagrams and radiographic images
- dissect all relevant structures and relate anatomical structures to clinical manifestations
- demonstrate surgical approaches in the relevant regions
- indicate the regions covered by local anaesthesia when performing nerve blocks
- discuss the principle anatomical similarities and differences among domestic animal species as they relate to its applications in clinical studies

Module Content:

The module will focus on applied (clinical and topographic) and comparative anatomy of the canines, felines, ruminants equines and pigs. Topics to be covered include: topographic and comparative anatomy of the head, neck, forelimb and hindlimb. Comparison and specificities in different species will be covered in this module. Similarly, applications to nerve blocks and surgery, as well as other therapeutic procedures in these regions will be covered. The gross anatomical aspects of these regions will be presented in an applied and integrated way.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (50%) and 1 x 3hr paper (50%)

Module Title:	VETERINARY PHYSIOLOGY II
Module Code:	BVM 3611
NQF Level:	6
Notional Hours:	160
Contact Hours:	Lectures: 4 x 1hr / week for 14 weeks (56 hrs) Practicals: 1 x 3hr / week for 14 weeks (42hrs)
NQF Credits:	16
Pre-requisites:	BVM 3552 Veterinary Physiology I
Co-requisite:	None

Compulsory / Elective: Compulsory
Semester Offered: 1

Module Aims:

This module is a continuation of Physiology I and aims to focus on the study of physiology of special of veterinary importance in Namibia. Systems to be discussed include digestive, respiratory; excretory, and the regulation of acids and bases as well as temperature. Physiological topics will be examined from a comparative and integrative perspective. The practical part of this module will emphasize on laboratory experiments, experimental techniques, and data collection of physiological variables.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the characteristics and comparative physiology of the digestive system of domesticated animals.
- discuss gastro-intestinal motility, secretory functions of gastro-intestinal tract, their regulation and gastro-intestinal hormones.
- describe and compare absorption, metabolism and excretion of various nutrients, appetite and control of feed intake in relevant species.
- describe the structure and functions of the respiratory system, including lung volumes, gas exchange, and gas transport in blood
- describe the structure and functions of the kidney, nephrons, including glomerular filtration, tubular reabsorption, tubular secretion, and excretion
- describe the structure and functions of skin with regard to temperature regulation and physiological response to the environment.
- Describe regulation of acids and bases in the body
- Explain the physiological control of body temperature in health and disease situations

Module Content:

The following specific topics will be covered:

Physiology of digestive system: review of gastrointestinal tract (GIT), main functions of digestive system, accessory digestive organs and glands, digestive phenomenon of monogastric and polygastric animals; regulation of the gastrointestinal tract functions, poultry digestive system;

Physiology of the respiratory system: organizational structure and functions, review of gas Law, breathing mechanisms, ventilation, gases exchange in the lung and in the tissue, respiratory volumes and capacities, respiratory sounds, control of respiration;

Physiology of the excretory system: organizational structure and functions of the kidney, urine formation, glomerular filtration rate, secretion and excretion of metabolites, control of water and electrolytes.

Regulation of acid base balance and temperature regulation in health and disease situations–

Functions of the skin: endothermic, poikilothermic and homoeothermic animals, body temperature regulation, animal physiological response to cold and hot environment, animal adaptation to hot climate, water and mineral balance.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 3hr paper

Module Title: VETERINARY PARASITOLOGY I
Module Code: BVM 3651
NQF Level: 6
Notional Hours: 160
Contact Hours: Lectures: 4 x 1hr / week for 14 weeks (56 hrs)
Practicals: 1 x 3hr / week for 14 weeks (42hrs)
NQF Credits: 16
Pre-requisites: BLG 3511 Introduction to Biology
Co-requisite: None
Compulsory / Elective: Compulsory
Semester Offered: 1

Module Aims:

This module focusses on endoparasites (helminthology and protozoology) and respective diseases of veterinary importance in Namibia as well the strategies for their control.

Learning Outcomes:

Upon completion of this module, students should be able to:

- recognize the various classes of parasites
- describe the pathologic and economic effects of selected endoparasites

- recommend methods and strategies for controlling or minimizing endoparasitic infection, both in the individual animal and on a herd basis
- identify representative parasite species using various laboratory and field techniques
- describe the life cycles of helminthic and protozoan parasites, as well as disease manifestations in the host species.

Module Content:

In this module students will be introduced to general parasitology, including the major endoparasites (Helminths and protozoans) of veterinary importance in Namibia, and more broadly in southern Africa. The following topics will be specifically covered:

General parasitology: Parasites and parasitism, Types of hosts, Host-parasite relationships; mode of transmission of parasites and methods of dissemination of the infective stages of the parasite, Parasite specificity in relation to species, breed, sex and location, Immunity against parasitic infestations.

Helminthology: Classification of helminths, characteristics of main groups, life cycle of helminths in relation to transmission, pathogenesis, epidemiology, diagnosis, and general control measures of trematodes, cestodes and nematodes of veterinary importance in the region. The diagnosis, treatment and prevention of diseases caused by Helminths will also be discussed, as well as the biological control of endoparasites.

Protozoology: General description of protozoa and their development; life cycle in relation to transmission, pathogenesis, diagnosis and control of protozoal diseases of veterinary importance.

Assessment Strategies:

Continuous Assessment: Minimum 3 theory assessments and at least 5 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	VETERINARY IMMUNOLOGY AND VACCINOLOGY
Module Code:	BVM 3602
NQF Level:	6
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr / week for 14 weeks (28 hrs) Practicals: 1 x 3hr practical / alternate week for 14 weeks (21hrs)
NQF Credits:	8
Pre-requisite:	None
Co-requisites:	BVM 3601 Introduction to Veterinary Microbiology
Compulsory / Elective:	Compulsory
Semester Offered:	2

Course Aims:

This module provides a short overview of veterinary immunology and vaccinology. It is designed to provide the student with an understanding of the basic principles and mechanisms underlying the immune system, with emphasis on the interaction between innate and acquired immunity in the response to infection.

Learning Outcomes:

Upon completion of this module, students should be able to:

- Distinguish between immunology and vaccinology
- Describe the innate and adaptive immune systems and the major components of each
- Explain how the immune system recognizes and responds to infectious agents and provides protection from disease
- Explain unique characteristics associated with immune mechanisms of neonates
- Describe the basic immune mechanisms associated with allergies, autoimmune disease, and adverse vaccine reactions.
- Distinguish between diagnostic tests for antigens and antibodies
- Interpret the results of serological tests
- Discuss the advantages and disadvantages of different types of veterinary vaccines
- Discuss the general reasons for vaccine failure
- Discuss factors influencing the duration of immunity
- Discuss factors that determine the quality of a vaccine

Module Content:

The module will cover the following topics: History and definition of concepts, types of immunity, tissues, organs and cells of the immune system, antigens and immunogenicity, antibodies and their interactions, Immune dysfunction including: autoimmunity and autoimmune diseases, immune response to bacterial, fungal, viral and parasitic infections; relationship between immunology and vaccinology, the general principles of immunization and vaccines,

types of vaccines, composition and development, factors affecting vaccine efficacy; vaccine preventable diseases, vaccination policy and immunization schedules with reference to Namibia.

The practical sessions will introduce students to blood collection and serum processing, applications of immunology: immuno-serological reactions, vaccination and other immunization techniques, as well as serological diagnosis of common animal diseases encountered in Namibia.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr paper

Module Title:	APPLIED COMPARATIVE ANATOMY II
Module Code:	BVM 3632
NQF Level:	6
Notional Hours:	160
Contact Hours:	7 hours of integrated theory and practicals/ week for 14 weeks (98 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3501 Veterinary Anatomy, Histology & Embryology I BVM 3572 Veterinary Anatomy, Histology & Embryology II
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

The module aims to cover applied and comparative anatomy of canines, felines, ruminants, equines and pigs. Applications to local anaesthesia and surgery, as well as other therapeutic and diagnostic procedures in the thorax, abdomen, and pelvis will be covered in an integrated way.

Learning Outcomes:

Upon completion of this module, students should be able to:

- correctly identify and compare similarities and differences of important anatomical features of domestic animals using live and preserved specimens, diagrams and radiographic images
- dissect all relevant structures and relate anatomical structures to clinical manifestations
- demonstrate surgical approaches in the relevant regions
- indicate the regions covered by local anaesthesia when performing nerve blocks
- discuss the principle anatomical similarities and differences among domestic animal species as they relate to its applications in clinical studies

Module Content:

The module will focus on applied (clinical and topographic) and comparative anatomy of the canines, felines, ruminants, equines and pigs. Topics to be covered include: the thorax, abdomen, and pelvis. Comparison and specificities in different species will be covered in this module. Similarly, applications to anaesthesia and surgery, as well as other therapeutic procedures in these regions will be discussed. The gross anatomical aspects of these systems would be presented in an applied and integrated way.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (50%) and 1 x 3 hr theory paper (50%)

Module Title:	VETERINARY PARASITOLOGY II
Module Code:	BVM 3652
NQF Level:	6
Notional Hours:	160
Contact Hours:	Lecture: 4 x1hr / week for 14 weeks (56 hrs) Practical: 1 x 3 hrs / week for 14 weeks (42 hrs)
NQF Credits:	16
Pre-requisites:	BLG 3511 Introduction to Biology
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module focusses on veterinary entomology and acarology and the impact of ectoparasites on the health and well-being of domesticated animals. The module will place an emphasis on understanding the biology of blood-feeding arthropods and the diseases they transmit to companion and livestock animals. It also discusses elements of

clinical parasitology such as the economic importance of ectoparasitic diseases, their diagnosis, treatment and control.

Learning Outcomes:

Upon completion of this module, students should be able to:

- describe the various classes of ectoparasites, including representative species
- discuss the pathologic and economic effects of selected ectoparasites
- identify representative ectoparasite species using laboratory and field techniques
- describe the life cycles and disease manifestations of different ectoparasites
- describe methods and strategies for controlling or minimizing ectoparasitic infestation, both in the individual animal and on a herd basis
- discuss the public health implications and economic impact of ectoparasites
- discuss the use of various chemicals and anti-parasitic drugs in the control of ectoparasites
- discuss the effects of chemical anti-parasitic drugs on the environment, and ways to minimise them
- discuss the role and importance of biological control methods

Module Content:

In this module the veterinary ectoparasites (Biting flies, ticks and mites, and mosquitoes and fleas) relevant to Namibia and Southern Africa will be studied. Veterinary Entomology will cover the morphology and biology of various arthropod ectoparasites, and concentrate on the lifecycle, diagnosis and control of selected species. Particular attention will be paid to the effects of chemical anti-parasitic drugs on the environment, and ways to minimise this will be studied. The role and importance of biological control methods will also be discussed. The role of arthropods as vectors will be covered as well as vector control and the economic importance of parasitic diseases. Veterinary acarology will focus on ticks and mites as well as the diseases they cause.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	ANIMAL NUTRITION AND PASTURE SCIENCE
Module Code:	BVM 3612
NQF Level:	6
Notional Hour:	160
Contact Hours:	Lecture: 4 x1hr / week for 14 weeks (56 hrs) Practical: 1 x 3 hrs / alternate week for 14 weeks (21 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3519 Veterinary Biochemistry
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module covers basic concepts in animal nutrition and analytical techniques used in assessing the feeding value of various rations and pastures. The module will also acquaint students with feed formulation and pasture management. Furthermore, the module introduces students to variable environmental conditions affecting natural and planted pastures.

Learning Outcomes:

Upon completion of this module, students should be able to:

- Discuss the different livestock feed resources in Namibia.
- Discuss the importance of major feed nutrients to livestock.
- Discuss the application of feed analysis and evaluation to livestock production.
- Discuss vitamin and mineral supplementation to farm animals
- Formulate nutritional feeding programs in livestock
- Discuss the common nutritional imbalances in selected farm animals and their management in Namibia
- Discuss factors affecting nutritive value of feedstuffs
- Design feed formulation schemes according to species needs
- Discuss the impact of animals, fires and climate on pastures for them to remain vigorous and productive under natural conditions
- Discuss the causes of pasture degradation
- Discuss the role of plants, rangelands and herbivores in the production of biogas and its economic benefits
- Recommend the level of intensity of management for different rangelands based on carrying capacity
- Formulate a holistic approach to pasture management and utilization
- Analyse animal feeds using different techniques

Module Content:

This module acquaints students with animal nutrition including key concepts and terminologies and the role of animal nutrition in animal production. It exposes students to different topics relating to animal nutrition of various livestock species, laboratory feeds analysis and feed evaluation; general comparison of plants and other sources of nutrients, animal feeds; plants as feed sources with special focus on nutritive values, availability, affordability; feed fractions and their nutritional implications; digestibility and degradability experiments; different techniques used for feed analysis ; use of feed value estimates; mineral and vitamin nutrition; forage and hay quality; utilization of rangelands by herbivores; management options; concept of rotational grazing. Application of appropriate measures towards preservation of nutritive value of pastures, hay and forages; feed formulation based on animal nutritional requirements; the concept of palatable and non-palatable pastures adapted to the Namibian climatic conditions; establishment of perennial and annual pastures; natural and planted pastures, utilization and management. The module will further cover nutritional imbalance disorders including metabolic diseases and their management.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 3hr paper

Module Title:	ANIMAL PRODUCTION
Module Code:	BVM 3622
NQF Level:	6
Notional Hours:	80
Contact Hours:	Lecture: 1x 2hrs / week for 14 weeks (28hrs) Practicals: 1 x 3hrs / alternate week for 14 weeks (21 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module is aimed at providing students with understanding, knowledge and skills required for the livestock industry in the Namibian economy. It will also cover managerial tools aiming at effective livestock production, and livestock marketing channels and livestock by-products.

Learning Outcomes:

Upon completion of this module, students should be able to:

- Discuss the origins of livestock and distribution in Africa,
- Discuss the importance and contribution of the livestock sector to the Namibian economy
- Discuss production systems and grazing management applied in Namibia
- Discuss breeds of livestock and the respective acclimatization abilities and traits of each breed
- Discuss the effect of different climatic conditions on livestock production and design a comprehensive livestock production scheme aimed at effective farming
- Discuss factors that must be taken into account in designing livestock production and management plans
- Identify livestock and livestock products markets and schemes in Namibia, regionally and internationally;
- Discuss marketing and marketing costs, marketing channels, and animal transportation to the market

Module Content:

The module will cover the following topics: the origins of livestock and their distribution in Africa, especially in the southern Africa region; livestock breed characteristics (cattle, horses, pigs, goats and sheep) farmed in Namibia; the importance of livestock for the Namibian economy; livestock production systems applied in Namibia; the effect of different climatic conditions in livestock production; feed production and management during different seasons; Namibian livestock production and management plans; grazing and browsing management; livestock production and management (requisite facilities and equipment, mating seasons, flock / herd composition and selection of replacement animals); livestock and livestock by-products markets and marketing costs, marketing channels; traceability (NamLITS) and transportation, Namibia's livestock trade and trading partners; opportunities and challenges in the livestock industry particularly in Namibia.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2 hr paper

Module Title	BIOMETRY
Module Code:	BVM 3642
NQF Level:	6
Notional Hours:	80

Contact Hours:	Lectures: 2 x 1hr / week for 14 weeks (28 hrs) Tutorials: 1 x 1hr / week for 14 weeks (14hrs)
NQF Credits:	8
Pre-requisites:	MAT 3511 Basic Mathematics
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to teach students to apply appropriate statistical tests to their data sets, and be able to correctly interpret statistical analyses. This module will take a practical approach to statistics that, while covering the mathematical bases of biostatistics, will predominantly focus on the implementation and interpretation of statistical tests.

Learning Outcomes:

Upon completion of this module, students should be able to:

- distinguish between different sampling methods and sources of data
- differentiate between types of data
- collate, summarise, analyse, interpret and present statistical animal health data including hypothesis testing
- describe and apply different types of measurements
- use scientific calculators and computer software for statistical manipulation
- Apply statistical analysis in biological research

Module Content:

The following topics will be covered in this module:

Introduction to biometry, types of data, random sampling; hypothesis testing; central tendency and variance; single samples, power analysis and data transformation; probability; inferences for one sample; summarizing and describing data; the two sample problem; contingency tables; introduction to non-parametric methods; the analysis of count data; analysis of variance; analysing proportion data; large data sets;

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: Z notation, mean, median, mode, quartiles, percentiles; Measures of dispersion: Variance, standard deviation, range, inter-quartile range, skewness and kurtosis; Identification of outliers: Use of scientific calculators and computer software for statistical manipulation, Application of statistical analysis in biological research.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments

Examination: 1 x 2hr paper

Module Title: FIELD ATTACHMENT I: PRODUCTION ANIMAL FARM

Module Code: BVM 3609

NQF Level: 6

Contact hours: 3 weeks

NQF Credits: N/A

Pre-requisites: None

Co-requisite: None

Compulsory/Elective: Compulsory

Semester Offered: 1 or 2

Module Aim:

This module is designed to expose students to practical experience of actual operations on livestock farms.

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- demonstrate practical skills related to livestock management and general farm activities

Module Contents:

Students will be attached to livestock farms for beef, dairy or small stock, or feedlots to participate in physical work and management of operations taking place. 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

Continuous Assessment: 100% logbook (20%)oral presentation at a seminar (20%)

field report (60%)

THIRD YEAR MODULES

Module Title:	CLINICAL DIAGNOSTICS
Module Code:	BVM 3701
NQF Level:	7
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr lectures per/ week for 14 weeks (28 hrs) Practicals: 1 x 3hrs / alternate week for 14 weeks (21hrs)
NQF Credits:	8
Pre-requisites:	BVM 3501 Veterinary Anatomy, Histology & Embryology I BVM 3572 Veterinary Anatomy, Histology & Embryology II BVM 3611 Veterinary Physiology II
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

The module will be mostly taught in a practical context. Routine diagnostic and therapeutic procedures are demonstrated and practiced for the major domestic animal species. This module will also cover principles of clinical pathology and associated sampling procedures.

Learning Outcomes:

Upon completion of this module, students should be able to:

- perform a thorough clinical examination on canines, felines, ruminants, equines and pigs
- use specific medical terminology in veterinary medicine
- describe selected clinical diagnostic sampling procedures
- explain basic principles of clinical pathology
- perform basic test such as blood smears, blood collection from the jugular vein, urine collection (free-flow) and rectal fecal sampling
- differentiate between routes of medicine administration, both parenteral and non-parenteral

Module Content:

Common diagnostic procedures used in key domestic animals, including a thorough, systematic, species specific clinical examination including pain assessment and sedation techniques; principles of clinical pathology.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2 hr practical examination (60%) and 1 x 2hr theory paper (40%)

Module Title:	HERD HEALTH MANAGEMENT AND ECONOMICS
Module Code:	BVM 3721
NQF Level:	7
Notional Hour:	80
Contact Hours:	Lecture: 1x 2hrs / week for 14 weeks (28hrs) Practicals: 1x3 hrs/ alternate week for 14 weeks (21 hrs)
NQF Credits:	8
Pre-requisites:	BVM 3619 Animal Ethology, Welfare and Health BVM 3602 Veterinary Immunology and Vaccinology BVM 3622 Animal Production
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

The module introduces principles of herd health and reproduction management in order to optimize production and health in dairy and beef cattle as well as small stock. Biosecurity measures will also be addressed. The module also aims to explain the role of animal health economics in the decision-making processes.

Learning Outcomes:

Upon completion of this module, students should be able to:

- identify factors contributing to poor health and production in bovines and small stock
- discuss the importance of body condition scoring in evaluating herd and flock performance
- recommend management strategies for new-born animals, weaners and adults
- discuss factors and recommend management strategies for controlling mastitis in herds
- discuss the objectives of dry period management in the production cycle of cows and ewes
- determine and predict metabolic diseases based on rumen activity
- evaluate herd fertility performance based on different parameters
- evaluate feeding strategies and ration balancing in relation to negative energy balance minimization
- recommend correct biosecurity measures to ensure optimum health of livestock
- keep proper herd health records
- discuss hoof management in cattle and small stock
- discuss the economic importance and contribution of the livestock sector in the Namibian economy
- analyze economic problems using basic methods such as partial budgeting, cost-benefit analysis and decision analysis
- describe the uses of linear and dynamic programming, and Markov chain and Monte Carlo simulations
- interpret spreadsheet models for economic analyses

Module Content:

Herd Health Management: The module will cover aspects of herd health, production and reproduction management programs in cattle and small stock. Emphasis will be given to monitoring and management of replacement rearing, dry period, milk production, herd fertility, udder health and nutrition in cattle. Similarly, the flock health, nutrition and production management of small stock will also be discussed. Biosecurity measures and the containment of diseases will be discussed.

Animal Health Economics : The module will cover the importance of animal diseases in efficiency of animal production, consumers' perceptions of animals and animal products, and global trade; analyse economic problems using basic methods such as partial budgeting, cost-benefit analysis and decision analysis; detail the critical steps in systems analysis and choose appropriate modelling types and techniques; describe the uses of linear and dynamic programming, and Markov chain and Monte Carlo simulations. The module will also discuss the basic principles of risk analysis; the basic steps in the decision-making process and the role of risk analysis in this process as well as the role of decision support systems in animal health management to demonstrate their profitability. Economic analysis of animal health will be interpreted by using spread sheet models in MS EXCEL. The module will also cover implementation and evaluation of animal health programs, and policy development and implementation processes.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr theory paper

Module Title:	INFECTIOUS DISEASES AND MICROBIOLOGY I
Module Code:	BVM 3711
NQF Level:	7
Notional Hours :	160
Contact Hours:	Lectures: 4 x 1hr lectures /week for 14 weeks (56 hrs) Practicals: 1 x 3hr practical / week for 14 weeks (42hrs)
NQF Credits:	16
Pre-requisites:	BVM 3601 Introduction to Veterinary Microbiology
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims to study pathogenic bacteria encountered in animals and the diseases they cause. The laboratory component focuses on the management of a veterinary microbiology lab as well as the isolation and identification of bacteria of veterinary importance.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss infectious diseases of bacterial origin of the skin and wounds, eye and ear, the respiratory system, gastrointestinal tract, urinary tract, reproductive tract and nervous system with regards to clinical signs, transmission, vectors, aetiology of disease, diagnosis and treatment with particular emphasis on notifiable and tropical diseases
- describe pathogenic traits of bacteria and host defences as both relate to the aetiology of disease
- discuss the use of different culture media, stains and biochemical tests for the identification of pathogens

- distinguish between normal and pathogenic flora in biological samples
- describe the mastitis syndrome and identify mastitis producing pathogens

Module Content:

The module will focus on bacterial pathogenesis and host defences, staining of bacteria, culture media and culturing and isolation of bacteria, selective and non-selective isolation of pathogenic bacteria, biochemical tests. Furthermore, emphasis will be placed on pathogenic bacteria causing systemic diseases of the skin and wounds, eye and ear, the respiratory system, gastrointestinal tract, urinary tract, reproductive tract and nervous system with regards to clinical signs, transmission, vectors, aetiology of disease, diagnosis and treatment with particular emphasis on notifiable and tropical diseases. Mastitis producing pathogens will also be discussed. Practical content will focus on personal safety, and will include laboratory work as well as demonstrations of sample collection using swabs, aspirates, impression smears, skin scrapings, biopsies and blood collection in different tubes.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 marked practical assessments
 Examination: 1 x 3hr theory paper

Module Title:	VETERINARY PHARMACOLOGY AND TOXICOLOGY I
Module Code:	BVM 3731
NQF Level:	7
Notional hours:	160
Contact hours:	Lectures: 4 x 1hr lectures /week for 14 weeks (56 hrs) Practicals: 1 x 3hr practical / alternate weeks for 14 weeks (21hrs)
NQF Credits:	16
Pre-requisites:	BVM 3519 Veterinary Biochemistry BVM 3611 Veterinary Physiology II BVM 3651 Veterinary Parasitology I BVM 3652 Veterinary Parasitology II
Compulsory/Elective:	Compulsory
Semester Offered:	1

Module Aim:

This module is aimed at exposing the students to the principles of pharmaco-therapeutics, pharmacokinetics, pharmacodynamics, the adverse responses, resistance and principles of drug action. Students will also study the nature, effects and detection of poison and poisoning, and the treatment of poisoning. This module will also cover the toxic plants of importance in the livestock industry.

Learning outcomes:

Upon completion of this module, students should be able to:

- Use pharmacological terms and abbreviations correctly
- perform pharmacological conversions and calculations
- describe and identify the pharmaceuticals affecting different systems of the body
- discuss general types and groups of drugs and their species specific use and contra-indications
- explain the methods of drug administration using appropriate routes in different animal species
- discuss the legislation governing storage, dispensing and disposal of veterinary drugs, as well as biosafety and biosecurity considerations
- identify toxic plants of importance in the livestock industry in Namibia
- describe the effects of toxic plants on various species and their economic importance, and treatment.
- discuss the levels of toxic principles as it relates to plant phenology

Module Contents:

The Pharmacology part will cover the science and study of drugs of veterinary importance, including their composition, uses and effects. This module will cover basic pharmacotherapeutic principles, pharmacodynamics, adverse responses, resistance, principles of drug action, species differences in response to drugs, and the classification of drugs and legal requirements for storing, dispensing and disposing of veterinary drugs as well as biosafety and biosecurity considerations.

The Toxicology part will cover the study of the nature, effects and detection of poison and poisoning, and the treatment of poisoning. This module will cover the toxic plants of importance in the livestock industry in Namibia, their identification, habitat, and phenology, effects on various species, economic importance, and treatment.

Assessment Strategies

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments
 Examination: 1 x 2hr practical examination covering toxic plants (30%) and 1 x 3hr theory paper (70%)

Module Title:	ETHNO-VETERINARY MEDICINE
Module Code:	BVM 3741
NQF Level:	7
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr lectures/ week for 14 weeks (28 hrs) Practicals: 1x 3hr / week alternate for 14 weeks (21hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

To teach students to appreciate and understand the importance and use of natural resources in veterinary medicine and the practice of ethno-veterinary medicine in relation to the different farming systems in developing countries, particularly Namibia.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the use of traditional medicine in different communities based on the locally available indigenous natural resources
- list the various and diverse natural resources found in Namibia which are used in the development and preparation of the different traditional remedies for the care of animal health and treatment of animal diseases
- discuss the use of ethno-veterinary medicine and traditional remedies within the different farming systems

Module Content:

This module covers traditional animal health care which encompasses the knowledge, skills, methods, practices, and beliefs about animal health care found among members of a particular community. This module is specifically intended to expose the students to the practices of the indigenous disease-prevention and treatment methods carried out by farmers, traditional healers particularly in communal areas in Namibia. Available information will be provided on treatment of animal diseases according to whether they conform to standard veterinary practice or close equivalents, or could be supported by scientific knowledge, or judged by traditional healers to be effective.

The following topics will be covered: Indigenous Knowledge Systems (IKS) as related to the use and application of herbal and traditional medicines, identification, collection and preparation of medicinal plants. The practical part of this module will focus on the collection and identification and classification of herbal/medicinal plants, identification and profiling of medicinal plant extracts.

This module will also cover ethno-veterinary practices-contemporary relevance and conservation of bioresources, ethno-botany and pharmacognosy, Traditional Medicine Systems (TMS) and the practice of ethno-veterinary medicine as related to the different farming systems in developing countries and particularly in the communal areas in Namibia.

Documentation of Local Health Traditions (LHTs). Pharmacological basis of ethno-veterinary Medicine, PRA and Assessment of Local health traditions, functional herbal remedies for primary health care of livestock , Use of plant products in animal production and health as applied in Namibia.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr paper

Module Title:	VETERINARY EPIDEMIOLOGY I
Module Code:	BVM 3751
NQF Level:	7
Notional Hours:	160
Contact Hours:	Lectures: 4 x 1hr / week for 14 weeks (56 hrs) Tutorials: 1 x 2hr / week for 14 weeks (28hrs)
NQF Credits:	16
Pre-requisites:	BVM 3642 Biometry
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

The module provides students with an understanding of the basic concepts of veterinary epidemiology and will include practical exercises on the strengths and weaknesses of different epidemiological study designs. The quality of evidence of causal relationships provided by different epidemiological study designs will be compared and

discussed within the framework of evidence-based medicine in order to judge the benefits of treatment and/or prevention and control methods.

Learning Outcomes:

Upon completion of this module, students should be able to:

- describe the principles and concepts of epidemiology and diagnostic-test validation and performance
- apply concepts of disease ecology, causality, patterns of disease occurrence, sampling methodology
- describe the disease events in populations
- explain and measure disease frequency
- discuss the host-agent-environmental interaction
- explain temporal, spatial and clustering factors
- apply epidemiological and statistical measures of association
- describe the design of an observational epidemiological study
- discuss errors due to observational measurement
- Interpret laboratory results

Module Content:

The module will cover the introduction to epidemiological concepts, definitions, purpose, meaning and scope of the discipline, disease causation, intrinsic and extrinsic determinants of disease, disease ecology and disease transmission. The disease events in populations and measuring disease frequency and production will be described. The host-agent-environmental interaction, temporal, spatial and clustering factors will be explained as well as in-depth application of epidemiological and statistical measures of association will be explained. The application of concepts and design of observational epidemiological studies and survey and sampling methodology, and sample size determination in the measurement of disease, describing errors due to measurement and interpreting laboratory results will be covered. Practical method of epidemiological investigation, questionnaire based surveys and clinical trial will be discussed.

Assessment Strategies:

Continuous Assessment: minimum 3 assessments

Examination: 1 x 3hr paper

Module Title	GENERAL SURGERY, ANAESTHESIOLOGY AND DIAGNOSTIC IMAGING
Module Code:	BVM 3772
NQF Level:	7
Notional Hours:	160
Contact Hours:	Lecture: 1x 4hrs / week for 14 weeks (56hrs) Practicals: 1x3 hrs/ week for 14 weeks (42 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3501 Veterinary Anatomy, Histology and Embryology I BVM 3572 Veterinary Anatomy, Histology and Embryology II BVM 3611 Veterinary Physiology II
Co-requisites:	BVM 3701 Clinical Diagnostics BVM 3731 Veterinary Pharmacology and Toxicology I
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

The module aims to introduce students to veterinary anaesthesiology with focus on the anaesthetist's role for the safe anaesthetic management of patients using injectable and inhalation anaesthetics. The module also aims to introduce students to the discipline of veterinary surgery and diagnostic imaging focusing on common domestic animals.

Learning Outcomes:

Upon completion of this module, students should be able to:

- relate different classes of anaesthetics to their species-specific use
- discuss the principles, concepts and techniques used in general and local anaesthesia in different species
- select the appropriate antidote of specific anaesthetics
- explain how to monitor the depth of anaesthesia and physiologic function of the animal
- select appropriate surgical instruments for each procedure
- differentiate between the various surgical instruments
- apply aseptic techniques in surgery
- assist experienced surgeons in the theatre
- monitor and handle animal recovery during the post-surgery period
- interpret veterinary diagnostic images and relate abnormal images to clinical data
- operate diagnostic imaging equipment effectively (rontgen/x-ray, ultrasound, and contrast technique)

Module Content:

General anaesthesiology- This introductory module in veterinary anaesthesiology will focus on the anaesthetist's role for the safe anaesthetic management of patients using injectable and inhalation anaesthetics. This requires an understanding of patient evaluation, selection and knowledge of premedication, induction and maintenance anaesthetic drugs as well as anaesthetic equipment, monitoring depth of anaesthesia and physiologic function. The canine patient will be used as the animal model for most of the module; however species specific differences with regards to drug and equipment choices/requirements will be discussed. Topics and techniques taught in this module will be revisited and applied by the student in other clinical studies modules.

Introduction to surgery -This introductory module will cover the basic principles of modern veterinary surgery, including asepsis, suture materials, suture patterns and surgical instrumentation. Principles of wound healing, wound management and infection control as well as patient management in the perioperative period will also be covered.

The most common elective and/or therapeutic surgical procedures used in small animals will be presented on an integrated organ system approach (skin, gastrointestinal, cardio-respiratory, and musculoskeletal). Emphasis is placed on the identification of disease and traumatic conditions treatable by surgical therapy, applicable surgical methods, and expected outcome.

Reference will be made to basic concepts in physical rehabilitation/therapy, conditioning and complementary treatments in small animals wherever applicable to a clinical situation.

Veterinary diagnostic imaging- Introductory lectures will focus on radiographic and ultrasonographic equipment, radiation safety, production of diagnostic quality radiographs and ultrasound images. Basic principles of interpretation of radiographs and ultrasonographs will be covered. More detailed discussion of imaging techniques (incl. contrast techniques), normal appearance and principles of interpretation of pathology in the various body systems will be integrated in the lectures focusing on specific organ system disease.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 marked practical assessments

Examination: 1 x 2hr practical examination (50%) and 1 x 3hr theory paper (50%)

Module Title:	GENERAL PATHOLOGY
Module Code:	BVM 3752
NQF Level:	7
Notional Hours:	160
Contact Hours:	Lecture: 1x 4hrs / week for 14 weeks (56hrs) Practicals equivalent to 42hrs (basic and necropsy techniques)
NQF Credits:	16
Pre-requisites:	BVM 3631 Applied Comparative Anatomy I BVM 3632 Applied Comparative Anatomy I BVM 3651 Veterinary Parasitology I BVM 3652 Veterinary Parasitology II
Co-requisites:	BVM 3701 Clinical Diagnostics
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

The module covers general principles of pathology across a range of species.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the mechanisms that underlie the development of lesions
- Recognize and differentiate the major types of lesions at gross and microscopic levels
- Examine and describe gross lesions using appropriate pathologic terminology
- Perform a basic post mortem examination of a selected species
- Distinguish between organic and acquired conditions

Module Content:

This module will cover common post mortem changes, disease detection/diagnosis after somatic death, cell responses to different grades of stimuli/injuries (cellular adaptation), cellular/tissue lesions and death, lesions due to disturbance of growth and cell differentiation, degenerative lesions and necrosis, lesions due to circulatory disturbances, hypersensitivity and aberrant immunological reactions. Practical training will expose the student to techniques used in a post mortem examination. In addition will students will be required to attend necropsies.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 marked practical assessments
Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	VETERINARY PHARMACOLOGY AND TOXICOLOGY II
Module Code:	BVM 3732
NQF Level:	7
Notional Hours :	160
Contact Hours:	Lecture: 1x 4hrs / week for 14 weeks (56hrs) Practicals: 1x3 hrs/ alternate week for 14 weeks (21 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3519 Veterinary Biochemistry BVM 3651 Veterinary Parasitology I BVM 3652 Veterinary Parasitology II BVM 3611 Veterinary Physiology II
Co-requisites:	BVM 3731 Veterinary Pharmacology and Toxicology I
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module covers advanced principles of pharmaco-therapeutics, pharmacodynamics, pharmacokinetics, the adverse responses, resistance and principles of drug action. Students will also study the detection, effects and management of chemical and industrial toxins, environmental concerns related to chemical waste as well as poisoning with insecticides, acaracides, rodenticides and plant control remedies.

Learning Outcomes:

Upon completion of this module, students should be able to:

- decide on the drug of choice for any parasitic (external and internal parasites), viral, bacterial, fungal infection
- classify drugs in different classes and distinguish between over-the counter and scheduled drugs explain which specific drugs are used for systemic therapy
- discuss withdrawal intervals of drugs
- distinguish ecto- and endoparasitic remedies ingredients
- apply the guidelines for the prescription of veterinary drugs
- explain how to combine some drugs safely
- discuss the prevention of drug residues in animals
- identify and describe mechanisms of action of chemical and industrial toxins
- discuss environmental concerns related to chemical waste
- discuss poisoning with insecticides, acaracides, rodenticides and plant control remedies
- discuss the treatment of venomation

Module Content:

In the Pharmacology part, the main drug groups will be covered in this semester, including appropriate selection of drugs, withdrawal intervals, and prescription writing. The following topics will be the main focus; local and general anaesthetics and sedatives, antimicrobial, anthelmintic and antiprotozoal agents, systemic drugs acting on cardiovascular, respiratory, digestive and reproductive systems, fluid therapy, pain management and chemotherapy.

In the Toxicology part, identification and mechanisms of action of chemical and industrial toxins, environmental concerns related to chemical waste will be discussed. Poisoning with insecticides, acaracides, rodenticides, anti-parasitic drugs and antidotes as well as plant control remedies will also be covered.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments
Examination: 1 x 3hr theory paper

Module Title:	INFECTIOUS DISEASES AND MICROBIOLOGY II
Module Code:	BVM 3712
NQF Level:	7
Notional Hours:	160
Contact Hours:	Lecture: 1x 4hrs / week for 14 weeks (56hrs) Practicals: 1x3 hrs/ week for 14 weeks (42 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3601 Introduction to Veterinary Microbiology

Co-requisite: BVM 3711 Infectious Diseases and Microbiology I
Compulsory / Elective: Compulsory
Semester Offered: 2

Module Aims:

To teach students about viral and fungal diseases as well as prions, with specific emphasis on those found in Namibia which have a significant economic impact, and how identify and control them.

Learning Outcomes:

Upon completion of this module, students should be able to:

- describe animal viral diseases, particularly those found in Namibia, which have significant economic impact
- describe the strategy of replication and the viral transmission mechanisms in each viral family
- describe procedures to control the spread of viral diseases and vaccination schemes
- describe the pathogenicity of viruses
- describe control and prevention strategies of prions and prions disease of importance
- diagnose and treat fungal, viral and prion diseases
- describe how mycotoxins and mycotoxicosis can be controlled

Module Content:

The module will cover the overview on virology, viral diseases, pathogenesis of viral diseases, diagnosis, treatment and control of viral diseases, virus families and associated diseases. Prions and prion diseases will also be discussed. Overview on mycology, mycoses: superficial, subcutaneous, systemic; mycotoxins and mycotoxicosis, diagnosis and treatment of fungal infections and antifungal drugs will also be covered.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 practical assessment

Examination: 1 x 3hr theory paper (40%)

Module Title: VETERINARY EPIDEMIOLOGY II
Module Code: BVM 3762
NQF Level: 7
Notional hours: 80
Contact hours: Lectures: 2 x 1hr lectures per week for 14 weeks (28hrs)
Tutorials: 1 x 3hr / alternate week for 14 weeks (21hrs)
NQF Credits: 8
Pre-requisites: BVM 3601 Introduction to Veterinary Microbiology
Co-requisite: BVM 3751 Veterinary Epidemiology I
Compulsory/Elective: Compulsory
Semester Offered: 1

Module Aim:

The focus of this module will be on applied veterinary epidemiology and will include practical exercises and case studies.

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- apply principles of disease surveillance and monitoring systems
- discuss basic concepts of risk analysis and their application to animal health decision making processes
- apply epidemiological principles to disease control and their application in state and international veterinary medicine
- design a questionnaires for epidemiological studies
- apply principles of data and information management and Geographic Information Systems
- discuss and apply the concepts of one health in policy and strategy formulation.
- apply principles of animal health economics to policy formulation and decision making processes
- communicate effectively on the health of animal and human populations to a range of audiences, including the general public, farmers, researchers, politicians and other key policy makers

Module Contents:

This module covers the theoretical and practical application of methods used in designing epidemiological studies, data and information management, applying concepts of monitoring and surveillance including principles of risk based surveillance. Introduction to risk analysis and its application to veterinary medicine will be covered. Planning, designing, managing and implementing disease control, prevention, eradication programmes at different levels including contingency planning, awareness, and communication and extension methods. The Health Concept will be introduced. Introduction to principles of livestock economics and their application in policy, strategy, programme

and project formulation including disease control management. The application of principles of economics to enterprise management, investment analysis and animal health care and veterinary delivery systems will be covered.

Assessment Strategies

Continuous Assessment: minimum 3 assessments

Examination: 1 x 3hr paper

Module Title: FIELD ATTACHMENT II: LABORATORY/GAME RESERVES

Module Code: BVM 3709

NQF Level: 7

Contact hours: 3 weeks

NQF Credits: N/A

Pre-requisites: None

Co-requisite: None

Compulsory/Elective: Compulsory

Semester Offered: 2

Module Aim:

This module is designed to expose students to practical experience of actual operations in a game reserve / conservancy / game farm or veterinary diagnostic laboratory based on student preference and availability of pre-approved facilities.

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- Demonstrate practical skills related to laboratory diagnosis of different diseases or management of wildlife
- interact with conservation scientists / veterinarians or laboratory scientists
- Apply and appreciate new developments in technology and limitations in the field

Module Contents:

Students will be attached to registered conservancies or game reserves or veterinary diagnostic laboratories to participate in daily activities and management of operations.

Assessment Strategies

Continuous Assessment: 100%

logbook (20%)

oral presentation at a seminar (20%)

FOURTH YEAR MODULES

Module Title: FISH AND BEE MEDICINE

Module Code: BVC 3801

NQF Level: 8

Notional Hours: 80

Contact Hours: Lectures: 2 x 1hr lectures per week for 14 weeks (28 hrs)

Practicals: 1x3 hrs/ alternate week for 14 weeks (21 hrs)

NQF Credits: 8

Pre-requisites: None

Co-requisite: None

Compulsory / Elective: Compulsory

Semester Offered: 1

Module Aims:

This module aims to introduce students to applied knowledge of fish anatomy, fish and bee husbandry and health, focusing on diseases of economic importance.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the causes, diagnosis, pathology, pathogenesis, control, and management of infectious and non-infectious diseases of fish, as well as applied anatomy
- Investigate health and production problems of fish and bees
- describe good management practices in fish conservation and medicine
- discuss the environmental conservation of bees
- undertake field studies of aquatic and bee sectors

- handle fish and bees safely and properly
- safely collect honey bee products

Module Content:

Fish medicine: This module will acquaint students with an overview of fish anatomy followed by fish husbandry as well as the aetiology, diagnosis, pathology, pathogenesis, chemotherapy, control, and management of infectious and non-infectious diseases of fish, especially pertaining to cultured food and tropical fish.

Bee medicine: This module will acquaint students with knowledge of honey bee husbandry as well as the aetiology, diagnosis, pathology, pathogenesis, control, and management of infectious and non-infectious diseases of bees.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr paper

Module Title:	SYSTEMIC PATHOLOGY I
Module Code:	BVC 3841
NQF Level:	8
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr lectures per week for 14 weeks (28 hrs) Practicals: 1x3 hrs/ alternate week for 14 weeks (21 hrs)
NQF Credits:	8
Pre-requisites:	BVM 3752 General Pathology
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

To expose students to systemic pathologic diagnosis of animal diseases by a systematic and species-specific approach based on common developmental, traumatic, degenerative, vascular, toxic, infectious, neoplastic and miscellaneous conditions, identify and describe common gross and microscopic lesions, and formulate a morphologic diagnosis or list of differential diagnoses. The focus in this module is the cardiovascular, reproductive, digestive, urinary and musculoskeletal systems.

Learning Outcomes:

Upon completion of this module, students should be able to:

- explain the pathogenesis of systemic diseases in selected animal species
- correctly perform animal necropsy
- prepare specimens for laboratory diagnosis including histopathology
- write an accurate pathology report
- interpret results from diagnostic tests
- relate specific pathological lesions to the relevant disease

Module Content:

This module will emphasize diseases affecting body systems, specifically the cardiovascular reproductive, digestive, urinary and musculoskeletal systems, cutaneous system with regards to the following: major and common malformations affecting the system and their characteristic features, degenerative lesions and their gross and microscopic pictures, inflammatory lesions and their gross and microscopic pictures, tissue lesions due to diseases affecting the system, special lesions peculiar to the systems, parasites found in the system and their effects, neoplasms especially primary neoplasms affecting the system.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 2hr theory paper (60%)

Module Title:	WILDLIFE CLINICAL STUDIES
Module Code:	BVC 3821
NQF Level:	8
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr lectures per week for 14 weeks (28 hrs) Practicals: 1x3 hrs/ alternate week for 14 weeks (21 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory

Semester Offered: 1

Module Aims:

This module aims to provide an overview to veterinary medicine as it relates to wildlife conservation and the game industry, focusing in particular on the One Health perspective, concentrating at the interface between wild animals, domestic animals and man. The main goal is to provide the managerial skills to monitor and maintain a healthy population of wildlife in Namibia.

Learning Outcomes:

Upon completion of this module, students should be able to:

- describe and compare good management practices in wildlife conservation and the game industry
- describe and compare good veterinary practices in wildlife conservation and the game industry
- discuss the aetiology, pathogenesis and diagnosis of some important diseases of selected wildlife and how they relate to domestic animals and man
- explain how to control the transmission of disease within wildlife species, and between wildlife, domestic animals and man and carry out large scale surveillance of wildlife populations to determine the presence/absence of common diseases
- describe and use appropriate drugs for the tranquilisation and immobilisation of wildlife for their capture, transport and care
- apply the regulations and ethics governing the use of drugs in wildlife immobilisation including response to accidental human exposure of these drugs
- apply regulations for the control of movement of game and their products within Namibia and for export and import

Module Content:

This module will provide an overview to wildlife veterinary medicine as it relates to both conservation and the wildlife industry. It will cover the major infectious diseases of wildlife and the transmission of these diseases both within wildlife and to domestic animals and man. The module will examine control measures for transmissible wildlife diseases from a One Health perspective including the effect of habitat loss and limited nutrition, fencing, movement control, vaccination and Commodity Based Trade (as it relates to wildlife). The fundamentals of pharmacology and physiology in wildlife anaesthesia will be discussed, and the module will provide both theoretical and practical training in the use of drugs used in the tranquilisation, anaesthesia and immobilisation of wild animals for their capture, transport and care including response to accidental human exposure of these drugs. Regulations pertaining to the use of drugs commonly used in wildlife immobilisation, the movement of game and their products, and the control of disease within wildlife will be covered.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr theory paper

Module Title:	VETERINARY PUBLIC HEALTH I
Module Code:	BVM 3811
NQF Level:	8
Notional Hours:	160
Contact Hours:	Lecture: 1x 4hrs / week for 14 weeks (56hrs) Practicals: 1x3 hrs/ alternate week for 14 weeks (21 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3651 Veterinary Parasitology I BVM 3652 Veterinary Parasitology II BVM 3752 General Pathology BVM 3711 Infectious Diseases and Microbiology I BVM 3712 Infectious Diseases and Microbiology II
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims to provide students with an overview of the role of the veterinary profession with respect to public health in terms of the One Health concept.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the role of the veterinary professional in public health
- describe the key features of quantitative risk assessment
- explain the effect of food-borne diseases on public health in terms of the One Health concept

- outline the various stages of the food chain that lead 'from farm to fork' and identify critical stages at which risks to public health may occur
- describe the key features of dairy management emphasizing potential sources of contamination in milk production
- explain the principles of HACCP with regards to food safety
- explain the control of the most important zoonotic, waterborne and food borne diseases

Module Content:

This module will provide students with an overview of the role of the veterinary professional with respect to the protection of the health of the public. Principles of Hazard Analysis and Critical Control Points (HACCP) and methods used to evaluate the risk of disease transmission, basic principles of food safety control (red meat, poultry meat, milk and eggs). The module will provide students with a comparative overview of the most important zoonotic, waterborne and food borne diseases.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments
 Examination: 1 x 3hr theory paper (60%)

Module Title:	PORCINE AND POULTRY CLINICAL STUDIES, HEALTH AND PRODUCTION
Module Code:	BVC 3831
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours /week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98 hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module focusses on ways to improve the health status and production effectiveness of intensive and extensive pig herds and poultry flocks from a holistic and cost-effective viewpoint by integrating and applying relevant veterinary knowledge with a view to identifying and solving health and production problems.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the pig and poultry industry in Namibia
- discuss the breeding and husbandry of pigs and chickens
- Identify and describe the aetiology and pathogenesis of some of important diseases of pigs and poultry
- diagnose and treat some of important diseases of pigs and poultry
- discuss nutritional and housing strategies to ensure maximum productivity of pigs and chickens
- recommend correct biosecurity measures applicable to piggeries and poultry houses
- integrate concepts of anatomy, physiology, disease manifestation as its applies to poultry and porcine treatment

Module Content:

The module will cover health, breeding, husbandry, disease diagnosis and treatment of pigs and poultry.

Pigs: nutrition and related disorders as well as diagnosis and treatment of important parasitic and infectious diseases and other miscellaneous conditions in pigs. Applied surgical techniques will be covered. A problem solving approach on a herd basis strives to improve the health status and production effectiveness of intensive and extensive piggeries from a holistic and cost-effective viewpoint.

Poultry: Poultry flock health and management programmes, including vaccination programs, aspects of housing and production systems, nutrition and nutritional diseases will be studied. Diagnosis and treatment of parasitic and infectious diseases of importance in the industry will be covered. Avian anatomy will also be studied in this module.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments
 Examination: 1 x 3hrs theory paper

Module Title:	VETERINARY PROFESSIONAL SKILLS
Module Code	BVM 3880
NQF Level	8

Notional Hours:	80
Contact hours	Lectures: 1 x 1hr lectures per /week for 28 weeks (28hrs)
NQF Credits	8
Pre-requisite	None
C0-requisite	None
Compulsory/Elective	Compulsory
Semester Offered	1 and 2

Module Aims:

This module aims to develop important skills, knowledge and attributes required by the veterinarian as a professional. The emphasis will be on developing the following skills: interpersonal skills, communication skills, stress and stress management, and business enterprise skills. In addition, this module also aims to provide students with a general understanding of state and private business management.

Learning Outcomes/Specific Outcomes

Upon completion of this module, students should be able to:

- manage private veterinary clinical practice properly
- conduct good practices in veterinary practice/hospital
- plan the establishment of a new veterinary clinic including the identification of equipment and drugs needed
- manage state owned veterinary office
- apply rules and regulations pertaining to state veterinary services
- compile an annual budget for a veterinary clinic
- maintain good client relationships and effective communication
- maintain high ethical standards

Module Content:

Concepts of animal health consultation; stress and its management; effective communication skills (basic communication and consultation skills based on a predominantly relationship-centred style, being able to apply and identify effective clinical interviewing techniques); business budgeting skills, identifying sources and symptoms of stress and practicing stress management techniques). This module also covers business management including personal and business finance, marketing and teamwork, communication and professionalism. Staff management and budgeting, and control of finances will be a major section of this module. Veterinary ethics, interpersonal communication, interpersonal skills as well as client relationship will also be discussed.

Assessment Strategies:

Continuous Assessment: 100 % (Minimum 3 assessments)

Module Title:	VETERINARY PUBLIC HEALTH II
Module Code:	BVM 3812
NQF Level:	8
Notional Hours:	160
Contact Hours:	Lectures: 4x 1hr lectures per week for 14 weeks (56hrs) Practicals: 1x3 hrs / week for 14 weeks (42 hrs)
NQF Credits:	16
Pre-requisites:	BVM 3651 Veterinary Parasitology I BVM 3652 Veterinary Parasitology II BVM 3752 General Pathology BVM 3711 Infectious Diseases and Microbiology I BVM 3712 Infectious Diseases and Microbiology II
Co-requisites:	BVM 3811 Veterinary Public Health I
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide the students with a broad understanding of the principles and programmes within the Namibian veterinary public health system, including environmental health and safety, food inspection and safety, and biological waste management.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the development and enforcement of laws and regulations impacting food animal processing industries and food consumers
- discuss the importance of the traceability of animals and animal products as it relates to food safety and disease control

- perform ante- and post-mortem inspection
- perform meat inspection in compliance with export and food safety regulations
- interpret and apply certification requirements of animals and animal products
- outline approaches to microbiological and physical foodborne hazard identification, testing, sampling and control
- discuss effective biological waste management strategies
- apply animal welfare principles in animal transport, holding, moving and slaughtering

Module Content:

This module should provide the students with a broad understanding of veterinary public health programmes. It includes environmental health, food safety and inspection, as well as biological waste management. It further covers development and enforcement of laws and regulations impacting animal-derived food processing industries and food consumers (e.g. traceability and ante- and post-mortem inspection and certification requirements, with emphasis on meat inspection. Pathological conditions associated with the transport of food animals and meat inspection, Hygiene in abattoirs, Health implications of emergency and causality slaughter. The module outlines approaches to microbiological and physical foodborne hazard identification, testing and sampling; and foodborne hazard prevention and control). Animal welfare standards at abattoirs will also be covered. Ante-mortem inspection of ruminants and pigs and inspection of poultry and aquatic foods (fish) for human consumption.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	SMALL ANIMAL CLINICAL STUDIES I
Module Code:	BVC 3812
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

The module aims to provide students with a holistic approach to the diagnosis and treatment of small animal patients through an integration of multidisciplinary veterinary procedures. Furthermore, the module also aims to provide the managerial skills to monitor and maintain a healthy population of cage birds.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the aetiology, pathogenesis of important diseases of dogs, cats and cage birds
- diagnose and treat important diseases of dogs, cats and cage birds
- assist with the anaesthetisation of small animals using appropriate drugs
- assist with diagnostic imaging of dogs, cats and cage birds
- interpret diagnostic images of dogs and cats for surgery and or medicine
- assist with selected surgery of dogs and cats
- administer veterinary drugs for treatment in dogs, cats and cage birds
- manage and care for small animal patients

Module Content:

This is a multi-disciplinary module where applied clinical pathology, diagnostic imaging, anaesthesiology, medicine and surgery are integrated to equip the student with a holistic approach to the diagnosis and treatment of small animal patient including cage birds. The main focus will be on dermatology, endocrine system and hemolymphatic disorders as well as gastroenterology in which the important medical and surgical approaches will be studied. Course material will provide students with an understanding of the pathophysiology, diagnosis, clinical management and best treatment options of disease processes affecting various organ systems.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	SYSTEMIC PATHOLOGY II
Module Code:	BVM 3802

NQF Level:	8
Notional Hours:	80
Contact Hours:	Lecture: 1x 2hrs / week for 14 weeks (28hrs) Practicals: 1x3 hrs / alternate week for 14 weeks (21 hrs)
NQF Credits:	8
Pre-requisites:	BVM 3752 General Pathology
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

To expose students to systemic pathologic diagnosis of animal diseases by a systematic and species-specific approach based on common developmental, traumatic, degenerative, vascular, toxic, infectious, neoplastic and miscellaneous conditions. Students will be expected to identify and describe common gross and microscopic lesions, and formulate a morphologic diagnosis or list of differential diagnoses. The focus in this module is respiratory, endocrine, haemopoietic and neuropathology.

Learning Outcomes:

Upon completion of this module, students should be able to:

- explain the pathogenesis of systemic diseases in selected animals species
- correctly perform animal necropsy
- prepare specimens for laboratory diagnosis including histopathology
- interpret results from diagnostic tests
- write an accurate pathology report
- relate specific pathological lesions to the relevant disease

Module Content:

This module will emphasize diseases affecting body systems, specifically the respiratory, endocrine, haemopoietic and neurological systems with regards to the following: major and common malformations affecting the system and their characteristic features, degenerative lesions and their gross and microscopic pictures, inflammatory lesions and their gross and microscopic pictures, tissue lesions due to diseases affecting the system, special lesions peculiar to the systems, parasites found in the system and their effects, neoplasms especially primary neoplasms affecting the system.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 3 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 2hr theory paper (60%)

Module Title:	RUMINANT CLINICAL STUDIES, HEALTH AND PRODUCTION I
Module Code:	BVC 3832
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide information on the common disorders of the major body systems of cattle, sheep and goats. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as herds and flocks, including preventative care and selected surgical procedures will be emphasized. The focus of this module will be on gastroenterology, nephrology, urology, respiratory and cardiovascular diseases.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the aetiology and pathogenesis of important diseases of ruminants
- diagnose and treat important diseases of ruminants related to gastro-intestinal, urinary, respiratory and cardiovascular systems
- assist with the anaesthetisation of ruminants using appropriate drugs
- assist with diagnostic imaging of ruminants
- interpret diagnostic images of ruminants for surgery and or medicine

- assist with selected surgery of ruminants including ruminotomy and sheath surgery
- administer veterinary drugs for treatment in ruminants
- manage and care for ruminant patients

Module Content:

This module provides information on the common disorders of the major body systems of cattle, sheep and goats. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as herd management, including preventative care and selected surgical procedures will be emphasized. It focuses on pathophysiology, symptomatology, differential diagnoses, diagnostic approach, clinical management (medical and surgical) and prognosis of the more important/common clinical conditions affecting cattle, sheep and goats related to gastrointestinal, urinary, respiratory and cardiovascular systems. Areas of focus include gastroenterology which will present important medical and surgical conditions affecting the digestive tract in ruminants, liver and pancreatic disease; nephrology and urology presentation of renal, ureteral, cystic, and urethral diseases; and respiratory and cardiovascular diseases.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments
 Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	FIELD ATTACHMENT III: PRIVATE/STATE VETERINARY CLINIC
Course Code:	BVM 3809
NQF Level:	8
Contact hours:	3 weeks (Private Veterinary Clinics or State Veterinary Clinics)
NQF Credits:	N/A
Pre-requisites:	None
Compulsory/Elective:	Compulsory
Semester Offered:	1 or 2

Module Aim:

The aim of this module is to expose students to practical knowledge of veterinary practice at Private or State Veterinary Clinics under the supervision of a Veterinarian and other technical experts in the field to be acquainted with the practicalities of a working environment.

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- relate to the working environment in Private or State Veterinary Clinics
- monitor and follow up clinical cases
- keep accurate records

Module Contents:

This module is designed to further expose students to the realities of working in either a private or state veterinary clinic. They are expected to observe and participate in different facets of clinical examinations, disease diagnosis, veterinary surgery and diagnostic imaging, provision of extension services and assist with management functions.

Assessment Strategies:

Continuous Assessment: 100% logbook (20%) oral presentation at a seminar (20%)
 field report (60%)

FIFTH YEAR MODULES

Module Title:	SMALL ANIMAL CLINICAL STUDIES II
Module Code:	BVC 3811
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Pre-requisites:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

The module prepares students to perform diagnosis, treatment and surgery of small animal patients including cage birds in a holistic approach through an integration of multidisciplinary veterinary procedures. The focus will be on

hepatic and pancreatic diseases, nephrology and urology, respiratory, cardiovascular, musculoskeletal and neurological diseases. Orthopaedic and trauma surgery will also be covered.

Learning Outcomes:

Upon completion of this module, students should be able to:

- diagnose and treat important diseases of dog, cat and cage birds
- anaesthetise small animals safely
- perform veterinary diagnostic imaging
- assist with selected surgery including orthopaedic procedures of small animals
- administer veterinary drugs for treatment in small animals
- manage and care for small animal patients

Module Content:

This is a multi-disciplinary module where applied clinical pathology, diagnostic imaging, anaesthesiology, medicine and surgery are integrated to equip the student with a holistic approach to the diagnosis and treatment of small animal patient including cage birds. The main focus will be on hepatic and pancreatic disease, nephrology and urology, respiratory and cardiovascular diseases. Common musculoskeletal and neurological diseases and trauma (fractures, lacerations etc.) in small animals will be included.

Course material will provide students with an understanding of the pathophysiology, diagnosis, clinical management and best medical or surgical treatment options of diseases and trauma affecting various organ systems.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	RUMINANT CLINICAL STUDIES, HEALTH AND PRODUCTION II
Module Code:	BVC 3819
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Pre-requisites:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims to provide information on the common disorders of the major body systems of cattle, sheep and goats. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as herds and flocks, including preventative care and selected surgical procedures will be emphasized. The focus of this module will be on musculoskeletal diseases, neurology, dermatology, hemolymphatic system and ophthalmology..

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the aetiology and pathogenesis of important diseases of ruminants
- diagnose and treat important diseases of ruminants related to musculoskeletal, central nervous, cutaneous, hemolymphatic and ophthalmic systems
- assist with the anaesthetisation of ruminants using appropriate drugs
- assist with diagnostic imaging of ruminants
- interpret diagnostic images of ruminants for surgery and or medicine
- assist with selected surgery of ruminants including claw amputation
- administer veterinary drugs for treatment in ruminants
- manage and care for ruminant patients

Module Content:

This module provides information on the common disorders of the major body systems of cattle, sheep and goats. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as herd management, including preventative care and selected surgical procedures will be emphasized. It focuses on pathophysiology, symptomatology, differential diagnoses, diagnostic approach, clinical management (medical and surgical) and prognosis of the more important/common clinical conditions affecting cattle, sheep and goats related to musculoskeletal, central nervous, cutaneous, hemolymphatic and ophthalmic systems.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments
Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	EQUINE CLINICAL STUDIES
Module Code:	BVC 3851
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Pre-requisites:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims to provide in-depth information on the common disorders of the major body systems of equines. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as stable management, including preventative care and selected surgical procedures will be emphasized.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the aetiology, pathogenesis of important diseases of the equine species
- Diagnose and treat important diseases of equines
- Anaesthetise horses safely
- Perform veterinary diagnostic imaging
- Perform selected surgical procedures of horses including castration
- Administer veterinary drugs for treatment in equine
- Manage and care for equine patients

Module Content:

This module concentrates on the diagnosis, treatment and control of conditions and diseases affecting the various organ systems of the horse. It gives an integrated approach covering aspects of infectious and parasitic diseases, clinical diagnostics, clinical pathology, diagnostic imaging, medical and surgical treatment options as well as preventative measures.

The module will cover various gastro-enteric and respiratory diseases. The study of the musculoskeletal disorders will emphasise the incidence, pathophysiology, and diagnosis of lameness. Equine dentistry will include routine floating of teeth as well as techniques of tooth extraction.

Furthermore, neurology will focus on disorders affecting the central and peripheral nervous systems, while in dermatology presentation of diseases of the skin and hooves will be dealt with. Common disorders of the hemolymphatic system will be covered while in ophthalmology the anatomy, pathophysiology and diseases of the eye and orbit will include medical and surgical management of common congenital and acquired ophthalmic diseases.

Oncology will cover basic diagnosis and treatment of important equine neoplasms. Equine neonatal medicine and surgery will be covered.

The insurance certification as well as pre-purchase examination of horses will be discussed in detail.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 practical assessments
Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	THERIOGENOLOGY, GYNAECOLOGY AND OBSTETRICS I
Module Code:	BVC 3871
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Pre-requisites:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1

Module Aims:

This module aims at developing the appropriate clinical and surgical skills of selected domestic animals with regards to reproduction (both normal and assisted) and pregnancy and parturition management and diagnosis as well as management of diseases and disorders of the female and male reproductive systems.

Learning Outcomes:

Upon completion of this module, students should be able to:

- Discuss and compare reproductive cycles in the male and female dog, cat, ruminant, horse and pig, including gametogenesis
- discuss normal fertilization and diagnostic approaches to infertility in selected animal species and apply appropriate management strategies
- Diagnose pregnancy in different animal species using appropriate methods including rectal examination, ultrasound and hormone testing
- recognize abnormal pregnancy and apply corrective measures
- discuss and observe normal parturition in all of the above species
- determine when intervention is necessary (including use of obstetrical instruments and performing caesarian sections in the above species)
- induce abortion and parturition in animal species
- manage dystocia and post-partum disorders of the female animal
- detect and manage infectious and non-infectious diseases and disorders of the male and female reproductive systems emphasizing causes of abortion

Module Content:

This module will cover practical and theoretical aspects of male and female reproductive biology, with particular emphasis on livestock and domestic animals' reproductive cycles, gametogenesis, fertilization and pregnancy diagnosis. Emphasis is on clinical aspects surrounding pregnancy and parturition management including dystocia in female animals. Post-partum disorders in the female animal, as well as diseases and disorders of the male and female reproductive system will be covered. Special emphasis will be given to causes of abortion in all species.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hrs theory paper (60%)

Module Title:	POLICY, LEGISLATION AND JURISPRUDENCE
Module Code:	BVM 3822
NQF Level:	8
Notional Hours:	80
Contact Hours:	Lectures: 2 x 1hr / week for 14 weeks (28 hrs)
NQF Credits:	8
Pre-requisites:	None
Co-requisites:	None
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide the student with an overview of public policy through legislation, regulation and operational strategy both for Namibia, regionally and internationally.

Learning Outcomes:

Upon completion of this module, students should be able to:

- differentiate between policy, legislation and regulations
- discuss processes involved in the formulation of public policy and legislation
- know and apply the relevant legislation as related to the practice of veterinary medicine in Namibia
- explain the role of jurisprudence in the practice of veterinary medicine

Module Content:

This module will provide the student with an overview of the formulation and implementation of public policy through legislation, regulation and operational strategy. Focus will be on Namibian legislation governing veterinary medicines, animal health, certification, animal welfare, and trade in animals and animal products.

A thorough knowledge and understanding of the legislation governing the practice of veterinary science by professionals and para-professionals are required, including the code of conduct, medical ethics and rules.

Assessment Strategies:

Continuous Assessment: minimum 2 theory assessments

Examination: 1 x 2hr paper

Module Title:	RUMINANT CLINICAL STUDIES, HEALTH AND PRODUCTION III
Module Code:	BVC 3872
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Co-requisite:	BVC 3819 Ruminant Clinical Studies, Health and Production II
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims to provide information on the common disorders of the major body systems of cattle, sheep and goats. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as herds and flocks, including preventative care and selected surgical procedures will be emphasized. The focus of this module will be on metabolic and endocrine disorders, as well as oncology and reproductive systems.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss the aetiology and pathogenesis of important diseases of ruminants
- diagnose and treat important diseases of ruminants related to metabolic diseases, oncology, endocrine and reproductive systems.
- anaesthetise ruminants using appropriate drugs
- perform diagnostic imaging of ruminants
- interpret diagnostic images of ruminants for surgery and or medicine
- perform selected surgery of ruminants including castration and teet surgery
- administer veterinary drugs for treatment in ruminants
- manage and care for ruminant patients

Module Content:

This module provides information on the common disorders of the major body systems of cattle, sheep and goats. Clinical signs, diagnostic tests and treatments options for disorders of individual animals as well as herd management, including preventative care and selected surgical procedures will be emphasized. It focuses on pathophysiology, symptomatology, differential diagnoses, diagnostic approach, clinical management (medical and surgical) and prognosis of the more important/common clinical conditions affecting cattle, sheep and goats related to metabolic diseases, oncology, endocrine and reproductive systems including the udder.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	SMALL ANIMAL CLINICAL STUDIES III
Module Code:	BVC 3839
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Pre-requisites:	None
Co-Requisites:	BVC 3811 Small Animal Clinical Studies II
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

The module prepares students to perform diagnosis, treatment and surgery of small animal patients including cage birds in a holistic approach through an integration of multidisciplinary veterinary procedures. The focus will be on ophthalmology, oncology, emergency medicine, dentistry behavioural medicine.

Learning Outcomes:

Upon completion of this module, students should be able to:

- diagnose and treat important diseases of dog, cat and cage birds

- anaesthetise small animals safely
- perform veterinary diagnostic imaging especially of the eye
- perform selected surgical procedures, including pan hysterectomy and castration of the dog and cat
- diagnose and treat cancer and other oncological related diseases in small animal patients
- provide emergency medicine and surgery to small animal patients
- Perform dental diagnosis and treatment including extraction
- manage and care for small animal patients

Module Content:

This is a multi-disciplinary module where applied clinical pathology, diagnostic imaging, anaesthesiology, medicine and surgery are integrated to equip the student with a holistic approach to the diagnosis and treatment of small animal patient including cage birds. Topics to be covered include anatomy, pathophysiology and diseases of the eye and ear, male and female reproductive systems, the biology, diagnosis, clinical presentation and treatment of neoplasms. Emergency Medicine and critical care including triage, shock, sepsis, systemic inflammatory response syndrome, multiple organ dysfunction syndrome, traumatology as well as monitoring the critical care patient will be included. In addition, various aspects of oral pathology and dentistry will be discussed. Treatment of behavioural problems using appropriate medicine and training methods will be covered.

Course material will provide students with an understanding of the pathophysiology, diagnosis, clinical management and best medical or surgical treatment options of diseases and trauma affecting various organ systems.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 7 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	THERIOGENOLOGY, GYNAECOLOGY AND OBSTETRICS II
Module Code:	BVC 3852
NQF Level:	8
Notional Hours:	160
Contact Hours:	7 hours / week of integrated learning and instruction (Lectures and Practicals) for 14 weeks (98hrs)
NQF Credits:	16
Co-requisites:	BVM3871 Theriogenology, Gynaecology and Obstetrics I
Compulsory / Elective:	Compulsory
Semester Offered:	2

Module Aims:

This module aims at developing the appropriate clinical and surgical skills of selected domestic animals with regards to reproduction (both normal and assisted) and pregnancy and parturition management and diagnosis as well as management of diseases and disorders of the female and male reproductive systems.

Learning Outcomes:

Upon completion of this module, students should be able to:

- discuss methods of synchronization of the reproductive cycle in the female animal
- perform semen evaluation and clinical examination of the male reproductive tract
- perform bull and ram testing including sheath scraping and various diagnostic tests for common diseases affecting reproduction
- Describe the manipulate animal reproductive cycles towards ensuring successful fertilization through natural or artificial insemination in various species
- Perform various methods of assisted animal reproduction (including artificial insemination and embryo transfer)
- Discuss cryopreservation and its role in the preservation of animal biodiversity.
- Discuss *in vitro* fertilization including stages of embryo development and sexual differentiation and manipulation of embryos

Module Content:

The module covers principles of assisted animal reproduction; semen collection and processing, reproductive cycle synchronization, artificial insemination, egg and embryo flushing; embryo transfer, *in vitro* maturation and fertilization, methods of sperm and embryo sexing and cryo-preservation.

Assessment Strategies:

Continuous Assessment: Minimum 2 theory assessments and at least 5 marked practical assessments

Examination: 1 x 2hr practical examination (40%) and 1 x 3hr theory paper (60%)

Module Title:	RESEARCH METHODOLOGY
Module Code:	BVM 3882
NQF Level:	8
Notional Hours:	120
Contact hours:	Lectures: 3 x 1hr lectures per week for 14 weeks (42 hrs)
NQF Credits:	12
Pre-requisites:	BVM 3751 Veterinary Epidemiology I BVM 3762 Veterinary Epidemiology II
Co-requisites:	None
Compulsory/Elective:	Compulsory
Semester Offered:	2

Module Aim:

This module will help to prepare students in the formulation and execution of a research project.

Learning outcomes:

Upon successful completion of this module, the student should be able to:

- identify appropriate literature using electronic and other resources
- write a literature review
- prepare and write a research proposal
- formulate an appropriate research questions and hypotheses
- design experiments to effectively answer research questions and test hypotheses
- use appropriate statistical tests to analyse and interpret data
- present results both orally and in the form of a scientific report

Module Contents:

The module covers the research process: research problem formulation and research objectives, research, methods and principles of research and experimental design, sampling methods including sample size determination and replication; ethics of research; the scientific method; observations, asking questions and formulation of hypothesis (null and alternative), predictions. Biological variation, populations and sampling and statistical significance will be covered.

Scientific writing, a literature review, a research proposal, report writing, plagiarism, finding and using literature references, citation of references, presentation of results will be covered.

Assessment Strategies

Continuous Assessment: 4 evaluated assessments (100%)

SIXTH YEAR MODULES

Module Title:	CLINICAL ROTATION
Module Code:	BVC 3890
NQF Level:	8
Notional Hours:	880
Contact Hours:	45 weeks starting December of the fifth year
NQF Credits:	88
Prerequisites:	None
Co-requisite:	None
Compulsory / Elective:	Compulsory
Semester Offered:	1 and 2

Module Aims:

The module is designed to develop and enhance the practical skills of students to enable them to attain the OIE recommended "Day 1 competencies" as well as NVC requirements. The rotations will be done under supervision of unconditionally registered veterinarians and other professionals.

Learning Outcomes:

Upon completion of this module students will be able to:

- Perform "Day 1 competencies" as recommended by the OIE and NVC

Module contents

Each student will be required to successfully complete the following rotations: Academic Hospital (16 weeks); Ambulatory Clinic (4 Weeks); Abattoir (Export/Local) (4 Weeks); Diagnostic Laboratory (4 Weeks); Herd Health & Pregnancy Diagnosis (PD) (7 Weeks); Necropsy (2 weeks), Equine Clinic (4 Weeks); Poultry and Pig Farm (4 weeks).

Assessment Strategies:

Final examination: 100% (oral practical examination in small animal, cage bird, ruminant, equine, pig and poultry veterinary science)

Successful completion of all rotations and proper maintenance and attendance as verified by entries in the Clinical Log Books will serve as examination admission to the final examination.

Module Title: RESEARCH PROJECT

Module Code: BVM 3880
NQF Level: 8
Notional Hours: 320
Contact Hours: N/A
NQF Credits: 32
Prerequisites: BVM 3882
CO-requisite: None
Compulsory / Elective: Compulsory
Semester Offered: 1 and 2

Module Aims:

Each student will be required to complete a Research Project, compile a written report and give an oral presentation on a relevant topic selected by the student and approved by the supervisor.

Learning Outcomes:

Upon completion of this module, students should be able to:

- Design, formulate and carry out an independent research project on a chosen topic under supervision
- Communicate research results both orally and in writing

Module Content:

Independent research on a chosen topic in any field of veterinary medicine

Assessment Strategies:

Continuous Assessment 100%: Oral presentation (20%) and written research report (80%)

M. M. SC. RANGELAND RESOURCES AND MANAGEMENT [17MSRR]

M.1. ADMISSION REQUIREMENTS

- M.1.1 The University of Namibia general regulations regarding admission of students to Master's Degree programmes shall apply.
- M.1.2 Notwithstanding the above, students wishing to enrol for this programme must be in possession of a good undergraduate Bachelor of Science degree in Agriculture, Biology, Life Sciences, or related field from a recognized and accredited institution of higher learning.

M.2 ASSESSMENT

The following were adopted to ensure high standards and competitive degree quality:

- M.2.1 A 3-hour theory examination at the end of each course;
- M.2.2 A pass mark of 60% for all courses, including the thesis;
- M.2.3 A weighting of 50:50 for continuous assessment (CA) and the final examination;
- M.2.4 At least 3 different continuous assessments for each course for core courses and 5 for generic courses;
- M.2.5 Only students with an attendance record of 80% of all course activities (excluding continuous assessment activities) and a minimum continuous assessment grade of 40% can write the final examination;
- M.2.6 A supplementary examination may be conducted in cases where a student has obtained a fail mark of 45 – 49% (hereinafter referred to as marginal fail) in the Regular Examinations. A student who fails to get the required passing marks after the supplementary examination will have to repeat the failed course in the subsequent year.
- M.2.7 A student can remain registered for a maximum of 4 years.
- M.2.8 Student will only be awarded M.Sc. degree in Rangeland Resources Management upon completion of all required courses with a pass mark of 60% or higher, including the thesis component.

M.3 DEGREE STRUCTURE

The following will be the structure of the degree.

- M.3.1 The degree name will be MSc. Rangeland Resources Management and will be housed and taught in the Department of Animal Science at the University of Namibia.
- M.3.2 It will be a two-year fulltime program with a 50:50 weighting of course work to research. The program is based at Neudamm Campus. Classes/Lecturing will take place during daytime.
- M.3.3 Coursework will be covered over two semesters in the first year while research and thesis work will be done in the second year.
- M.3.4 There will be a maximum of 15 students per intake (minimum 5 students) and new intakes will be done once in two years.
- M.3.5 The degree course work will comprise of: 8 compulsory core courses, 2 (out of 7) elective core courses and 2 compulsory generic courses. Graduation requires the completion of minimum 240 credits in line with NQA guidelines.
- M.3.6 Core courses, both compulsory and elective will be equally weighted at 12 credits each, equivalent to 40 hours, while generic courses will each be weighted at 16 credits, equivalent to 64 hours.
- M.3.7 Each core course will run over a 4-week block, while the generic courses will run over 28 weeks, across the two semesters.
- M.3.8 Six core courses will be taught each semester with a week's break between the core teaching blocks.
- M.3.9 Core course examinations will be written immediately after the course, during the inter-block break.
- M.3.10 To counter the anticipated time-tabling problem regarding the 7 elective courses, there will be restricted possible course combinations and sequencing in the student's degree plan.

M.4 TEACHING MODE

This will include; lectures, field work, discussion seminars, case studies, group projects etc.

M.5 THESIS COMPONENT

Only students who have successfully passed all coursework shall be allowed to undertake research in Rangeland and Resources Management. Each student is required to propose a topic and write a proposal for research before the end of the first year. The official registration for the thesis will depend upon acceptance of her/ his proposal by Faculty Postgraduate Studies Committee.

Two (2) supervisors are recommended per student and the main supervisor must be from UNAM and must be a PhD holder. All theses must be externally examined.

M.6 PROGRAMME SCHEDULE**FIRST YEAR**

MODULE CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS	COMPULSORY/ ELECTIVE
Semester 1						
UAE 5819	Academic Writing for Postgraduate Students	8	04/56	0		Compulsory
ASC 5900	Research/ Exp Design & Analysis	9	2	0.3	8	Compulsory
ASC 5920	Geographic Info Systems & Remote Sensing	9	1.1	1.2	8	Compulsory
ASC 5981	Intro Integrated Resource Management	9	7/w	3/w	12	Compulsory
ASC 5991	Rangeland Ecosystem Structure & Function	9	7/w	3/w	12	Compulsory
ASD 5981	Soil Dynamics	9	7/w	3/w	12	Elective
ASW 5981	Water Dynamics	9	7/w	3/w	12	Elective
ASE 5981	Environmental Physiology	9	7/w	3/w	12	Elective
ASL 5981	Land Use Planning	9	7/w	3/w	12	Elective
ASF 5981	Fodder Flow	9	7/w	3/w	12	Elective
ASR 5981	Rangeland Management	9	7/w	3/w	12	Compulsory
TOTAL SEMESTER 1 CREDITS					128	
Semester 2						
ASC 5900	Research/ Exp Design & Analysis	9	2	0.3	8	Compulsory
ASC 5920	Geographic Info Systems & Remote Sensing	9	1.1	1.2	8	Compulsory
ASC 5992	Rangeland Degradation and Its Mitigation	9	7/w	3/w	12	Compulsory
ASN 5982	Nutrition of Foraging Animals	9	7/w	3/w	12	Compulsory
ASS 5982	Sustainable Livelihoods	9	7/w	3/w	12	Compulsory
ASR 5982	Range Biodiversity and Conservation	9	7/w	3/w	12	Compulsory
ASC 5982	Wildlife Ecology & Management	9	7/w	3/w	12	Elective
ASE 5982	Natural Resource Economics	9	7/w	3/w	12	Elective
ASP 5982	Natural Resource Policies	9	7/w	3/w	12	Elective
TOTAL SEMESTER 2 CREDITS					116	
TOTAL FIRST YEAR CREDITS					244	

SECOND YEAR

MODULE CODE	MODULE TITLE	NQF LEVEL	CREDITS	COMPULSORY/ ELECTIVE
Semester 1				
ASC 5910	Research Project / Thesis	9		Compulsory
Semester 2				
ASC 5910	Research Project / Thesis	9		Compulsory
TOTAL SECOND YEAR CREDITS				128
TOTALS				340

M.7 MODULE DESCRIPTORS: RANGELAND RESOURCES MANAGEMENT

FIRST YEAR MODULES

AASC 5900: RESEARCH / EXPERIMENTAL DESIGN AND ANALYSIS

Module Title RESEARCH / EXPERIMENTAL DESIGN AND ANALYSIS

Code AASC 5900

NQA Level 9

National Professional

Standards Competencies N/A

Contact Hours:

Lecturers /week:

Practicals/week: 28 weeks (64 Contact Hours) compulsory

Credits 16

Modules Assessment: Assessment: CA [50%] at least 5 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.

CA: 50%

Exam: 50%

Prerequisites

Module Description (content): A: Social research methods: Research paradigms and associated methodologies; positivism, phenomenology and critical theory: A critical difference between quantitative and qualitative research in terms of the nature of their empirical data should be discussed, purpose and nature of research, a basic overview of research design and methodology. Survey research; define and explain the purpose and describe the types, survey research cycle, discuss the advantages and challenges of the research strategy and methodology and the role of indicators, describe data gathering techniques, instruments analysis and presentation. Participatory rural appraisal (PRA); define, and explain the purpose and describe the types of PRA, PRA cycle, research strategy and methodology, the advantages and value, challenges and shortfalls of the method. The research proposal: define the research proposal, its purpose and the steps involved in writing it. Clearly and fully describe the layout and contents of the research proposal. Describe how research proposals should be evaluated, and the importance of that step. Scientific communication Describe what should be contained in a research report. Explain the importance of an oral presentation, and how it should be prepared and done

B: Research/Experimental Design and Analysis Review of basic analytical techniques: review basic concepts of graphical and numerical data summary i.e. how to summarize data in form of tables and graphs, how to calculate measures of central tendency and measures of dispersion, merits and demerits of each of the measures of central tendency and measures of dispersion, the ideas of probability and confidence intervals in relation to statements made about results of experiments and surveys; the importance of the normal, F-distribution and t-distribution in statistics; the sampling distribution of the mean and hypothesis testing and introduce the concepts of sampling error and standard error and calculation of confidence intervals. Standard Experimental Designs; Completely randomized design; show how to design a simple experiment using the principles of replication, randomization and local control; analysis of variance (ANOVA), results of one-way ANOVA, compare treatment means, and how to present the results. Discuss the advantages and disadvantages of the design. Randomized block design, principle of blocking including advantages and disadvantages; latin square designs and its usefulness; factorial experiments. Comparison of treatment means: describe the most important procedures for mean comparisons and when they should be used. e.g. LSD, DMRT, Orthogonal contrasts. Explain the difference between comparison-wise and experiment-wise error rates, discuss the advantages and disadvantages of the most popular multiple comparison tests. Regression and correlation: the concept of dependent and independent variables, the uses and abuses of the simple and multiple regression; calculate and interpret correlation coefficient and coefficient of determination; the concept of least squares point estimates and least squares regression line and how to test hypothesis about a regression line; polynomial regression (polynomial fitting), types of curves e.g. exponential growth curves, logistic curves. Non Parametric Statistics: Introduce alternative tests to the parametric tests used in previous units, advantages and disadvantages of non-parametric tests. 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 Correspondence Analysis) with practical examples. Other ordination approaches can also be covered, multivariate Statistical Analysis software packages (e.g. CANOCO for Windows, TWINSpan for Windows, PC-ORD for Windows, NMMDS, DECORANA) and demonstrates how they are used.

AASC 5920: GEOGRAPHIC INFORMATION SYSTEMS AND REMOTE SENSING

Module Title: GEOGRAPHIC INFORMATION SYSTEMS AND REMOTE SENSING
Code AASC5920
NQA Level 9
National Professional Standards Competencies N/A
Contact Hours: 28 weeks (64 Contact Hours) compulsory
Lecturers /week:
Practicals/week:
Credits 16
Modules Assessment: Assessment: CA [50%] at least 5 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites None

Module Description (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.

AASC 5981: INTRODUCTION TO INTEGRATED RESOURCES MANAGEMENT

Module Title INTRODUCTION TO INTERGRATED RESOURCES MANAGEMENT
Code AASC5981
NQA Level 9
National Professional Standards CompetenciesN/A
Contact Hours:
Lecturers /week: 40 (4 weeks) compulsory
Practicals/week:
Credits 12
Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites None

Module Description (content)

Ecosystem approach: principles to ecosystem management; ecosystem structure, functions and integrity; ecosystems connectivity; scales in ecosystem management, e.g. basin management; application of Convention on Biology Diversity and Ecosystem Approach Toolkit. Dealing with complexity and dynamism; Socio-ecological system components, behavior and interactions; scales in socio – ecology system. Institutions of Natural Resource Management: institutional arrangements in governing natural resources; decision making process, trade-offs and competing interests; conflict resolution mechanisms, challenges and best practices; policy responses in the southern African region regarding Natural Resource Management (NRM), property rights, legal frameworks, regulations regarding amongst others: pricing and subsidies, markets, Community Based Natural Resources Management (CBNRM). Adaptive management and action research: shifting paradigm from seeking solutions to generating learning opportunities to continuously improve ecosystem management; integration of formal scientific knowledge and local knowledge in an adaptive management framework; approaches to engage interest groups as partners in action research; formulation of action research; measuring natural resource performance. Knowledge management: partnerships in multi-stakeholder issues; data management (spatially reference data), including local knowledge; information sharing approaches aiming to achieve shared understanding of system properties and change; organization/institutional learning. Systems analysis tools: models as management tools; application of modeling to natural resource management; data bases, GIS; decision and negotiation support tools.

AASC 5991: RANGELAND ECOSYSTEM STRUCTURE AND FUNCTION

Module Title RANGELAND ECOSYSTEM STRUCTURE AND FUNCTION
Code AASC5991
NQA Level 9
National Professional Standards CompetenciesN/A

Contact Hours: 4 weeks (40 Contact Hours) compulsory
Lecturers /week:
Practicals/week:
Credits 12
Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites none

Module Description (content)

This course aims at describing the general structure and processes that are characteristic of Southern African rangelands. Southern African rangelands are a basic resource for the survival of the majority of Southern African rural population. Proper and sustainable management of these rangelands require defining these rangelands in Southern Africa and the processes that drive them. Types and distributions of major rangeland types will be described to illustrate the diversity of structures, including floristically and including the faunal species associated with the rangelands.

Rangeland ecosystem structure consists of the soil, plants, animals and invertebrates. Foraging activities of rangeland herbivores play an important role on the integral functioning of rangelands. These effects will be discussed to lay the foundation on principles and practices associated with the rangelands. Changes occurring on rangelands, the causes and models used to describe these changes as well as implications of understanding and describing rangeland dynamics on rangeland management.

Defining Southern African rangelands; understand the significance of the different scale and levels of organization in rangeland description; understand the major Southern African biomes and their determinants; understand the role of grazing and grazing management on rangeland ecosystem integrity as well as understanding of rangeland vegetation dynamics models.

AASD 5981: SOIL DYNAMICS

Module Title SOIL DYNAMICS
Code AASD5981
NQA Level 9
National Professional Standards Competencies N/A
Contact Hours: 4 weeks (40 Contact Hours) elective
Lecturers /week:
Practicals/week:
Credits 12
Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites none

Module Description (content)

Soil chemical processes: discuss the dynamics of nutrient cycling in the context of the impacts of rangeland management practices on the rates and directions of the various processes involved, describe surface functional groups, sorption processes and exchange reactions in soils, quantity-intensity relationships in soils, discuss redox chemistry and soil acidity and alkalinity and their relevance in soil management. Comparative analyses of the various chemical processes across different soil types and climatic gradients, implication of rangeland management practices on soil chemical properties and soil and processes. Soil organic matter (SOM): biophysiochemical processes in soils (e.g. decomposition, properties of SOM,) and their importance in rangeland management. Impacts of various management practices on the nitrogen cycle. Comparative analyses of the various processes involved across different soil types and climatic gradients. Implications of rangeland management practices on soil biophysiochemical properties and soil processes. Soil water, the holding capacity, measurements, and flow in the soil. Inferences should be made on issues related to soil erosion, irrigation, drainage and floods as the result of improper management strategies. Water movement in soil (Darcy's law of water flow), soil morphology; and soil conservation.

AASW 5981: WATER DYNAMICS

Module Title WATER DYNAMICS
Code AASW 5981
NQA Level 9
National Professional Standards Competencies N/A
Contact Hours: 4 weeks (40 Contact Hours) elective

Lecturers /week:
Practicals/week:
Credits 12
Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites none

Module Description (content)

Water cycle: components of the water cycle and the fluxes of the planet's water, implications on the management of plants, animals and the land as a whole. Climate, drought, flood, water quantity and quality (both surface and ground water). Water quality standards used in the southern African region should be explained, especially the one used by the South African River Health Program such as SASS5 (or similar). The need to continuously monitor water quality in rangeland ecosystems must be explained – how and why it is done. Watershed management, watershed water balance, watershed water capture, storage and release. Water harvesting and utilization especially given that much of southern Africa is semi-arid to arid. Water pollution, sources and types. Policies and legislation addressing water pollution must be discussed with particular reference to rangeland management. Ways of preventing and mitigating water pollution.

AASE 5981: ENVIRONMENTAL PHYSIOLOGY

Module Title ENVIRONMENTAL PHYSIOLOGY

Code AASE 5981

NQA Level 9

National Professional

Standards CompetenciesN/A

Contact Hours: 4 weeks (40 Contact Hours) elective

Lecturers /week:

Practicals/week:

Credits 12

Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.

CA: 50%

Exam: 50%

Prerequisites none

Module Description (content)

Introduction to physiology of foraging animals: cell structure and function (The significance of knowledge of cell structure and its functions in understanding physiological process). Osmo-regulation and excretion, circulating body fluids and functions. Respiratory system. Climatic Physiology and temperature regulation: regulation of body temperatures. Adjustment to ambient temperature variation; cold, response to heat. Morphological and anatomical features relevant to temperature regulation. Body conformation, limits of temperature regulation in hot and cold. Water and animal physiology: distribution of body water; water balance; Photoperiodism: seasonal physiological change; allometry of food intake (energy requirements, body size); genetic adaptation; reproductive and digestive physiology: importance in terms of production assessment.

AASL 5981: LAND USE PLANNING

Module Title LAND USE PLANNING

Code AASL 5981

NQA Level 9

National Professional

Standards CompetenciesN/A

Contact Hours: 4 weeks (40 Contact Hours) elective

Lecturers /week:

Practicals/week:

Credits 12

Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.

CA: 50%

Exam: 50%

Prerequisites none

Module Description (content)

Land use planning; familiarize students with concepts of existing land use planning guidelines e.g. for land evaluation, agro-ecological zoning and discuss their application in the Namibia context; environmental sustainability, criteria, current land use cover and land cover change detection; land use planning procedure, participatory methods for local and regional land use planning; techniques of resource survey and mapping, food agriculture organization (FAO) framework and guidelines for land evaluation; land capability classification; agro-ecological zoning methodology; importance of GIS and remote sensing in land use planning and image processing; decision

support tools in local-level land use planning. Land tenure: Land tenure regimes governing land use in southern Africa; opportunities and challenges underlying tenure systems; land rights and tenure arrangements.

AASF 5981: FODDER FLOW

Module Title	FODDER FLOW
Code	AASF5981
NQA Level	9
National Professional Standards Competencies	N/A
Contact Hours:	4 weeks (40 Contact Hours) compulsory
Lecturers /week:	
Practicals/week:	
Credits	12
Modules Assessment:	Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA:	50%
Exam:	50%
Prerequisites	none

Module Description (content)

Fodder production from rangelands: Discuss the importance of natural grasslands as major sources of nutrients for range animals including wild life; the nutritional limitations of utilizing natural grasslands and appropriate mechanisms for improving their nutritional quality applicable to range communities especially pastoralists; overview of the different pasture management practices to improve productivity of native pasture lands, livestock productivity, animal husbandry practices and disease control; the importance and methods of reseeding and over sowing; methods of establishing cultivated pastures and conditions, choice of plant species and management of cultivated pastures.

Management of sown and improved tropical legume pastures: Explain the concept of incorporating forage legumes into natural grasslands and their role in providing quality fodder to range animals while preserving the natural resource base; the factors which affect and favor legumes in grass/legume pastures, overview of fertilizer use to improve pasture productivity and factors limiting their use in tropical rangelands especially in Africa; explain the principles and importance of pasture biomass assessment and its application in pasture management, soil surface protection and erosion; Utilization and conservation of forage: Explain the importance of fodder utilization and conservation, the different methods of forage conservation e.g. standing hay or differed feed, hay, silage and haulage.

Fodder flow planning: strategies for drought feeding: Explain the nutrition aspects of drought feeding and the strategies to be adopted for different agro-ecological zones; discuss the different strategies for feeding range animals in periods of severe feed shortages (drought feeding); the strategy for drought feeding based on molasses and other supplementary feed stuffs.

AASR 5981: RANGELAND MANAGEMENT

Module Title:	RANGELAND MANAGEMENT
Code:	AASR 5981
NQF Level:	9
National Professional Standards	
Competencies:	N/A
Contact Hours:	4 weeks (40 Contact Hours) Compulsory
Credits:	12
Module Assessment:	CA 50%: at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations) Examination 50%: One 3 hrs written examination paper
Prerequisites:	None

Module description (content): Students will be exposed to topics such as Eco-physiology of southern Africa, rangeland herbivorous interaction, rangeland management, carrying capacity, current land issues, range monitoring and evaluation, sustainable use of rangeland and drought mitigation strategies, problems of bush/weed 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 weeds. 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. Students will also be exposed to practical activities at the farm at Neudamm and elsewhere within the country.

AASC 5982: WILDLIFE ECOLOGY AND MANAGEMENT

Module Title	WILDLIFE ECOLOGY AND MANAGEMENT
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Code	AASC 5982
NQA Level	9
National Professional Standards Competencies	N/A
Contact Hours:	40 contact hours (4 weeks) elective
Lecturers /week:	
Practicals/week:	
Credits	12
Modules Assessment:	Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA:	50%
Exam:	50%
Prerequisites	none

Module Description (content): Population dynamics: define wildlife and wildlife management and its importance; the factors which influence fluctuations of animal populations in the wild; the patterns of growth of animal populations and the differential equations which describe the various patterns (logistic, geometric and exponential); explain the need for reliable information on population size and reproductive rates; the inherent qualities/properties of wildlife populations: rate of increase, age structure, lifespan, sex ratio, fecundity/natality and mortality; interspecific dynamics, intraspecific dynamics, territoriality and home range, dispersal patterns and migrations; the mechanisms of population regulation, including density-dependent and density-independent factors (and how these can be extrinsic or intrinsic). Wildlife nutrition and water requirements: Wildlife feeding and nutrition; influence of variations in gut anatomies (including feeding classes), body sizes and physiology on nutritional requirements. Counting wild animals: Emphasize the importance of collecting data on animal counts in wildlife management, pros and cons of the various methods applied in animal censuses; discuss home range, territories and social organization: the use of some statistical models to characterize home ranges of animals such as minimum convex polygon model, density estimation models (bivariate, normal, harmonic mean, and kernel), the importance of radio telemetry as a tool in many modern studies of animal behaviour, ecology, management and conservation; home range utilization (intensity of use) by wild animals and the concept of the 'centre of activity; define a 'territory' and compare and contrast a home range and territorial behaviour. Define a 'social animal' and social organization in wild animal populations; social behaviour.

Wildlife utilization and conservation systems in southern Africa: Define wildlife utilization/harvesting and explain the purposes including the concept of maximum sustained yield (MSY) and optimum sustained production (OSP), culling controversies, conservation and the causes of wildlife extinctions considered in the issues such as: types of protected area systems and their functions, ecosystem-based vs species-based approaches, influence of size of protected area, minimum viable population concept and population viability analysis, importance and effects of corridors, culling in parks and reserves and its controversies, conservation outside parks and reserves, and community-based wildlife management initiatives in southern Africa, international conservation issues including IUCN Red Data Books, the role of CITES, etc.

AASC 5992: RANGELAND DEGRADATION AND ITS MITIGATION

Module Title	RANGELAND DEGRADATION AND ITS MITIGATION
Code	AASC 5992
NQA Level	9
National Professional Standards Competencies	N/A
Contact Hours:	4 weeks (40 Contact Hours) compulsory
Lecturers /week:	
Practicals/week:	
Credits	12
Modules Assessment:	Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination
CA:	50%
Exam:	50%
Prerequisites	none

Module Description (content)

Define 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.

AASN 5982: NUTRITION OF FORAGING ANIMALS

Module Title	NUTRITION OF FORAGING ANIMALS
Code	AASN 5982
NQA Level	9
National Professional Standards Competencies	N/A
Contact Hours:	4 weeks (40 Contact Hours) compulsory

Lecturers /week:
Practicals/week:
Credits 12
Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites none

Module Description (content)

Nutritional diversity of rangeland forage. Define the term rangeland in its broad sense and give an overview of the feeding and nutrition of animal; discuss the species and diversity of range forages and their nutritive value. Discuss biotic factors including plants anatomy, differences in plant parts, plant age, stage of growth; and biotic factors including season of growth, range site conditions, stocking rate, livestock and wildlife species. Animal foraging behavior and diet selection: Diet selection and foraging behavior; wildlife feeding nutrition; factors affecting food availability, quantity and quality. Review the classification of range forage base, on their functional attributes and the types of foods eaten including bulk/ roughages grazers, concentrate selectors and intermediate feeders. Factors which influence diet selection of foraging animals. Determination of the amounts and quality of nutrients derived from grazing animal's diets. Foraging behavior of range animals including foraging tactics of range animals. Establish forage quality effects on foraging behavior of animals; Present and discuss the inherent factors which affect diet selection by foraging animals.

Range land animal nutritional requirements: The concept of animal nutritional requirements to support metabolic activities for normal health and vigor, growth rate, reproduction and or normal lactation levels; the roles and requirements of the most important nutrients essential for the metabolic activities of foraging animals. Discuss the three protein fractions when considering the protein requirements , soil and plant factors which affect mineral content of pastures; the important major minerals required for grazing stock production , role of anti – nutritional factors and their effects on nutritive value of forages.

AASS 5982: SUSTAINABLE LIVELIHOODS

Module Title SUSTAINABLE LIVELIHOODS
Code AASS 5982
NQA Level 9
National Professional Standards Competencies N/A
Contact Hours: 4 weeks (40 Contact Hours) compulsory
Lecturers /week:
Practicals/week:
Credits 12
Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.
CA: 50%
Exam: 50%
Prerequisites

Module Description (content)

Land, agriculture, poverty and rural livelihoods in Africa – an introduction on food security, poverty and sustainable development; Rangeland Resource Management (RRM): Services and Markets; Describe issues that revolve around effective rangeland resources management e.g. service provision, research, communication and interaction between service providers and clients, refinements. Cross-cutting RRM including issues such as decentralization, governance and institution building, impacts of HIV/AIDS on RRM, engendering rangeland resource management. Land and agrarian reform; discuss technical information and background on the history of land and agrarian reform and introduce models currently implemented in Namibia, South Africa and Mozambique, supplemented by other relevant examples from the region. Sustainable Livelihoods Framework. Hands on application of the livelihoods framework.

AASR 5982: RANGE BIODIVERSITY AND CONSERVATION

Module Title RANGE BIODIVERSITY AND CONSERVATION
Code AASR 5982
NQA Level 9
National Professional Standards Competencies N/A
Contact Hours: 4 weeks (40 Contact Hours) compulsory
Lecturers /week:
Practicals/week:
Credits 12

Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.

CA: 50%

Exam: 50%

Prerequisites none

Module Description (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 of 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).

AASE 5982: NATURAL RESOURCE ECONOMICS

Module Title NATURAL RESOURCE ECONOMICS

Code AASE5982

NQA Level 9

National Professional

Standards CompetenciesN/A

Contact Hours:

Lecturers /week: 4 weeks (40 Contact Hours) elective

Practicals/week:

Credits 12

Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.

CA: 50%

Exam: 50%

Prerequisites none

Module Description (content)

Introduction to natural resources economics, environmental economics and agricultural economics: economic value of rangeland natural resources, use and non-use values, economic valuation of range resources including biodiversity, species and habitats, ecosystem function, conservation, water, soils, incentives and appropriation of value-local and global. RM and NRM relevant applications: cases from southern Africa; natural resources accounts: Botswana, Namibia, raising local natural resource benefits and lowering local opportunity costs: CBNRM, assessing the economic impact of desertification: Namibia, differential land use, land taxation in Namibia, poverty rights and common-pool resources: examples and lessons learnt in southern Africa and elsewhere. Introduction to some analytical tools, cost effectiveness analysis, benefits and costs, supply and demand, economic efficiency and markets. National budgets, international financing, aid: strategy overviews; financing RRM: public and private investments, budgeting, Government budgets, aid, cooperation and trade. Current RRM relevant economic debates: top hits; food security, land reform, alternative land uses: weighing the economic-social and environmental benefits and value, water pricing, valuation of protected areas, access and benefit sharing: how to unlock the potential of natural resources, international trade and subsidies: how does the global economy affect RRM in southern Africa and international aid: What is needed and what is useful.

AASP 5982: NATURAL RESOURCE POLICIES

Module Title NATURAL RESOURCE POLICIES

Code AASP5982

NQA Level 9

National Professional

Standards CompetenciesN/A

Contact Hours:

Lecturers /week: 4 weeks (40 contact hours) elective

Practicals/week:

Credits 12

Modules Assessment: Assessment: CA [50%] at least 3 assessment opportunities (e.g. tests; written assignments; reports; oral presentations). Final Exam [50%]: One 3 hour written examination.

CA: 50%

Exam: 50%

Prerequisites none

Module Description (content)

Policy formulation, analysis and implementation. The price linkage: fiscal expenditures; support for agriculture; improving the incomes of the rural poor. Gender and rural development: the key issues for discussion here are the deeply rooted traditional codes of condition, division of labor and unfair inheritance laws. Principal aspects of a legal

framework; Policy analysis and implementation; agricultural policies and their impact on other natural resources in the economy; competitiveness of developing countries' exports in the world market; the existence of mega tariffs of 200- 300 % on agricultural commodities in developed countries; trade liberalization and the reallocation of resources towards a country's comparative advantage

UAE 5819: ACADEMIC WRITING FOR POSTGRADUATE STUDENTS

Module Title:	ACADEMIC WRITING FOR POST GRADUATE STUDENTS
Code:	UAE5819
NQF Level:	9
Contact hours:	4 lecture periods per week and 1 practical session per week for 14 weeks
Credits:	16
Module Assessment:	CA: (1 x 3 hour exam paper)
Prerequisites:	Must be a postgraduate student.

Content:

This module is a post-graduate course designed to empower students with skills and knowledge to access and critique academic sources and to synthesize information from these sources to assist them in the substantiation and development of their own claims when writing an academic paper in their respective fields of specialization. Additionally, this course will empower students with the capacity to undertake the challenges of academic writing by exposing them to the different rhetorical and stylistic elements typical of academic texts. Finally, students will be introduced to the American Psychological Association (APA) writing style and will be equipped with the necessary skills to format an academic paper in APA style.

SECOND YEAR: THESIS COMPONENT

AASC 6910: RESEARCH PROJECT / THESIS

Module Title	RESEARCH PROJECT/THESIS
Code	AASC 6210
NQA Level	9

National Professional

Standards Competencies N/A

Contact Hours: Second Year; compulsory

Lecturers /week:

Practicals/week:

Credits 128

Modules Assessment:

Thesis component

Only students who have successfully passed all coursework shall be allowed to undertake research in Range Resource Management. Each student is required to propose a topic and write a proposal for research before the end of the first year. The official registration for the thesis will depend upon acceptance of her/ his proposal by Postgraduate Students Committee.

Two (2) supervisors are recommended per student and the main supervisor must be from UNAM and must be a PhD holder. All theses must be externally examined.

Prerequisites A pass in all coursework modules

Module Description (content)

A student, who has successfully completed the coursework phase, shall undertake research in an approved topic in rangeland management. 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. After the thesis has been examined by the two supervisors, it will be sent for further examination by an external assessor. The candidate will be required to defend the thesis before a panel of examiners according to the Rules and Regulations of the University of Namibia.

APPENDIX 1: Articulation of the New Diploma Curriculum into the Degree Programme

TABLE 1

ARTICULATION					B.Sc. Degree Structure for Diploma Students having completed the new curriculum and joining FANR Degree Programme as of 2012:	
FANR B.Sc. Degree Programme (Agriculture)			New Diploma Agriculture (Neudamm and Ogongo Campus)			
Course Code	Title		Course Code	Title	Course Code	Title
1st Year			1st Year		1st Year	
1st Semester			1st Semester		1st Semester through CES	
UCLC 3509	Computer Literacy	Exemption through:	UCLC 3509	Computer Literacy		
ULCE 3419	English Communication and Study Skills	Exemption through:	ULEG 2410	English for General Communication		
UCSI 3529	Contemporary Social Issues	Exemption through:	UCSI 3529	Contemporary Social Issues		
ULEA 3519	English for Academic Purposes				ULEA 3519	English for Academic Purposes
SBLG 3411	Introduction to Biology	Exemption through:	AASC 2401	Biology		
SPHY 3401	Physics for Life Sciences I	Exemption through:	AASC2411	Physical Science		
SMAT 3511	Basic Mathematics				SMAT 3511	Basic Mathematics
2nd Semester			2nd Semester		2nd Semester through CES	
SCHM 3532	Chemistry for Life Sciences	Exemption through:	ACSC 2512	Soil Science and		
			ACSC 2601	Water Management + Soil Conservation		
SPHY 3412	Physics for Life Sciences II				SPHY 3412	Physics for Life Sciences II
SBLG 3512	Diversity of Life	Exemption through:	AASC 2401	Biology		
			ACSC 2412	Principles of Crop Production		
			AASC 2502	Applied Animal Breeding		
			AASC 2411	Physical Science		

ARTICULATION					B.Sc. Degree Structure for Diploma Students having completed the new curriculum and joining FANR Degree Programme as of 2012:	
FANR B.Sc. Degree Programme (Agriculture)			New Diploma Agriculture (Neudamm and Ogongo Campus)			
Course Code	Title		Course Code	Title	Course Code	Title
SMAT 3512	Precalculus				SMAT 3512	Precalculus
SSTS 3522	Introduction to Statistics				SSTS 3522	Introduction to Statistics
2nd Year			2nd Year		2nd Year	
1st Semester			1st Semester		1st Semester	
AGEC 3681	Principles of Microeconomics				AGEC 3681	Principles of Microeconomics
AGEC 3691	Rural Sociology	Exemption through:	AGEC 2422	Communication Information Systems +		
			AGEC 2521	Introduction to Rural Sociology		
			AGEC 2601	Extension Methods		
AASC 3601	Genetics				AASC 3601	Genetics
ACSC 3681	Plant Science	Exemption through:	ACSC 2602	Crop Production and		
			ACSC 2611	Vegetable + Fruit Production		
AFST 3601	Human Nutrition				AFST 3601	Human Nutrition
AFST 3621	General Microbiology				AFST 3621	General Microbiology
2nd Semester			2nd Semester		2nd Semester	
AAEN 3602	Agricultural Engineering	Exemption through:	ACSC 2502	Farm Technology I and		
			ACSC 2612	Farm Technology II		
AGEC 3682	Production Economics				AGEC 3682	Production Economics
AGEC 3692	Principles of Macroeconomics				AGEC 3692	Principles of Macroeconomics
AASC 3612	Biochemistry				AASC 3612	Biochemistry
AASC 3602	Livestock Production Systems	Exemption through:	AASC 2502	Applied Animal Breeding and		

ARTICULATION					B.Sc. Degree Structure for Diploma Students having completed the new curriculum and joining FANR Degree Programme as of 2012:	
FANR B.Sc. Degree Programme (Agriculture)			New Diploma Agriculture (Neudamm and Ogongo Campus)			
Course Code	Title		Course Code	Title	Course Code	Title
			AASC 2611	Intensive Production and Animal		
			AASC 2612	Extensive Production Animal		
ACSC 3682	Agronomy	Exemption through:	ACSC 2602	Crop Production and		
			ACSC 2611	Vegetable + Fruit Production		
AFST 3602	Food Technology				AFST 3602	Food Technology

TABLE 2

ARTICULATION						
						B.Sc Degree Structure for Diploma Students
						having completed the new curriculum and
						joining the FANR Degree Programme as of 2012:
FANR B.Sc. Degree Programme (Natural Resources)			New Diploma in Natural Resource Management (Ogongo Campus)			
Course Code	Title		Course Code	Title	Course Code	Title
1st Year			1st Year		1st Year	
1st Semester			1st Semester		1st Semester through CES	
UCLC 3409	Computer Literacy	Exemption through:	UCLC 3409	Computer Literacy		
ULCE 3419	English Communication and Study Skills	Exemption through:	ULEG 2410	English for General Communication		
UCSI 3429	Contemporary Social Issues	Exemption through:	UCSI 3429	Contemporary Social Issues		
ULEA 3419	English for Academic Purposes				ULEA 3419	English for Academic Purposes
SBLG 3411	Introduction to Biology	Exemption through:	AASC 2401	Biology		
SPHY 3401	Physics for Life Sciences I	Exemption through:	AASC2411	Physical Science		
SMAT 3511	Basic Mathematics				SMAT 3511	Basic Mathematics
2nd Semester			2nd Semester		2nd Semester through CES	
SCHM 3532	Chemistry for Life Sciences	Exemption through:	ACSC 2512	Soil Science and		
			ACSC 2601	Water Manag. + Soil Conservation		
SPHY 3412	Physics for Life Sciences II				SPHY 3412	Physics for Life Sciences II
SBLG 3512	Diversity of Life	Exemption through:	AASC 2401	Biology		
			AASC 2411	Physical Science		
			AIES 2511	Plant Entomology and Pathology		

ARTICULATION						
						B.Sc Degree Structure for Diploma Students having completed the new curriculum and joining the FANR Degree Programme as of 2012:
FANR B.Sc. Degree Programme (Natural Resources)			New Diploma in Natural Resource Management (Ogongo Campus)			
Course Code	Title		Course Code	Title	Course Code	Title
			AIES 2532	Silviculture		
			AIES 2532	Introduction to Agroforestry		
SMAT 3512	Precalculus				SMAT 3512	Precalculus
SSTS 3522	Introduction to Statistics				SSTS 3522	Introduction to Statistics
2nd Year			2nd Year		2nd Year	
1st Semester			1st Semester		1st Semester	
AGEC 3681	Principles of Microeconomics				AGEC 3681	Principles of Microeconomics
AGEC 3691	Rural Sociology	Exemption through:	AGEC 2422	Communication Information Systems +		
			AGEC 2521	Introduction to Rural Sociology		
			AGEC 2601	Extension Methods		
AASC 3601	Genetics				AASC 3601	Genetics
AIES	Ecology				AIES	Ecology
AIES 3621	Principles of Wildlife Management				AIES 3621	Principles of Wildlife Management
ANRE 3601	Environmental Science	Exemption through:	AIES 2622	Nat. Resource Policies+Administration		
			AIES 2612	Integr. Nat. Resource Mgt.+Planning		
AFST 3621	General Microbiology				AFST 3621	General Microbiology
2nd Semester			2nd Semester		2nd Semester	through CES
AGEC 3692	Principles of				AGEC 3692	Principles of

ARTICULATION						
						B.Sc Degree Structure for Diploma Students having completed the new curriculum and joining the FANR Degree Programme as of 2012:
FANR B.Sc. Degree Programme (Natural Resources)			New Diploma in Natural Resource Management (Ogongo Campus)			
Course Code	Title		Course Code	Title	Course Code	Title
	Macroeconomics					Macroeconomics
AASC 3612	Biochemistry				AASC 3612	Biochemistry
AIES 3682	Plant Physiology				AIES 3682	Plant Physiology
AIES 3602	General Soil Science	Exemption through:	ACSC 2512	Soil Science		
			ACSC 2601	Water Management & Soil Conservation		
ANRE 3602	Climatology and Hydrology				ANRE 3602	Climatology and Hydrology
ANRF 3692	Natural Resource Economics	Exemption through:	AIES 2602	Intro. to Natural Resource Economics		

APPENDIX 2: MODULE EQUIVALENTS (Diploma and Degree programmes)

MODULE EQUIVALENTS	
OLD GRN CURRICULUM	NEW UNAM CURRICULUM
1 st YEAR	
Module Code + Title	
ACA 2100 Farm Duties	AACA 2400 Farm Duties
ACB 2111 Computer Skills	UCLC 3409 Computer Literacy

MODULE EQUIVALENTS	
OLD GRN CURRICULUM	NEW UNAM CURRICULUM
ACB 2121 Mathematics	AGEC 2411 Mathematics + Basic Statistics
ACB 2131 Biology	AASC 2401 Biology
ACB 2141 Chemistry	AASC 2411 Physical Science
ACB 2151 English + Communication Skills	ULEG 2410 English for General Communication
ACB 2161 Physics	AASC 2411 Physical Science
AEC 2112 Basic Concepts in Economics and Management	AGEC 2402 Basic Economics
ASC 2112 Animal Nutrition	AASC 2412 Animal Nutrition and Feeding
ASC 2132 Introduction to Ecology	AIES 2442 General Ecology
CSC 2112 Principles of Crop Production	ACSC 2412 Principles of Crop Production
AEN 2111 Surveying	no equivalent identified
ASC 2111 Animal Anatomy + Physiology	no equivalent identified
ASC 2122 Animal Reproduction + Breeding	no equivalent identified
AEN 2112 Workshop Technology	no equivalent identified
CSC 2122 Soil Science	no equivalent identified
MODULE EQUIVALENTS	
OLD GRN CURRICULUM	NEW UNAM CURRICULUM
2nd YEAR	
Module Code + Title	
ACA 2200 Farm Duties	AACA 2500 Farm Duties
ASC 2211 Range Management I	AASC 2511 Range Management
ASC 2221 Animal Health I	AASC 2512 Applied Animal Health
CSC 2211 Crop Protection	ACSC 2511 Crop Protection
NRO 2211 Introduction to Agroforestry	AIES 2531 Introduction to Agroforestry
AEN 2211 Farm Power + Machinery	ACSC 2502 Farm Technology I
AEC 2221 Research Methodology	AGEC 2502 Introduction to Social Research Methods
AEC 2211 Introduction to Extension	no equivalent identified
AEC 2212 Financial Management	AGEC 2501 Financial Management
AEC 2222 Indigenous Resource Management and Rural Sociology	AGEC 2521 Introduction to Rural Sociology
ASC 2212 Range Management II	AASC 2511 Range Management

MODULE EQUIVALENTS	
OLD GRN CURRICULUM	NEW UNAM CURRICULUM
ASC 2222 Animal Health II	AASC 2512 Applied Animal Health
ASC 2232 Small Ruminant Production	no equivalent identified
ASC 2242 Dairy Production	no equivalent identified
CSC 2212 Vegetable + Fruit Production	no equivalent identified
AEN 2212 Land Use Planning	no equivalent identified
MODULE EQUIVALENTS	
OLD GRN CURRICULUM	NEW UNAM CURRICULUM
3rd YEAR	
Module Code + Title	
ACA 2300 Farm Duties	no equivalent identified
AEC 2311 Marketing Policy + Trade	AGEC 2621 Marketing, Trade + Policy
ASC 2311 Beef Production	AASC 2612 Extensive Animal Production
ASC 2321 Pelt + Fibre Production	no equivalent identified
ASC 2331 Pig Production	AASC 2611 Intensive Animal Production
CSC 2311 Field Crops Production	ACSC 2602 Crop Production
AEN 2311 Animal Draft Power Technology	ACSC 2612 Farm Technology II
AEC 2341 Communications + Information Systems	no equivalent identified
AEN 2321 Soil + Water Management	ACSC 2601 Water Management + Soil Conservation
AEC 2312 Extension System Approaches	AGEC 2601 Extension Methods
AEC 2322 Personnel Management	no equivalent identified
AEC 2332 Introduction to Entrepreneurship	AGEC 2622 Entrepreneurship
AEC 2342 Project Management	AGEC 2602 Project Management
ASC 2312 Ostrich Production	AASC 2611 Intensive Animal Production
ASC 2322 Game Farming	AASC 2602 Game Farming
ASC 2332 Sustainable Resource Management	no equivalent identified
ASC 2342 Poultry Production	no equivalent identified
AEN 2312 Farm Structures	ACSC 2612 Farm Technology II
AEN 2322 Irrigation + Drainage	no equivalent identified

MODULE EQUIVALENTS	
OLD GRN CURRICULUM	NEW UNAM CURRICULUM