FACULTY PROSPECTUS 2011

FACULTY OF AGRICULTURE AND NATURAL RESOURCES

Inspiring minds & shaping the future

NOTE

This Faculty Prospectus is valid for 2011 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 2011.

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 2011 or any subsequent year.

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

CONTENTS PAGE

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 and Research to Feed the Nation"

2011 ACADEMIC CALENDAR

FIRST SEMESTER

10 January	University opens
20 January	Academic staff resumes office duties
31 January - 18 Feb	Registration (Last day for Late Reg: 23 Febr)
21 February	**Lectures commence for FIRST SEMESTER**
26 April	EASTER BREAK starts
03 May	Institutional Holiday
05 May	Lectures resume after Easter Break
10 June	**Lectures end for FIRST SEMESTER**
14 June	First Opportunity Examinations commence (Semester I modules)
01 July	First Opportunity Examinations end (Semester I modules)
01 July	**End of 1st Semester**
11 – 15 July	Mid-year Recess

SECOND SEMESTER

25 July	**Lectures commence for SECOND SEMESTER**
12 September	SPRING BREAK starts
19 September	Lectures resume after Spring Break
04 November	**Lectures end for SECOND SEMESTER**
08 November	First Opportunity Examinations commence (Semester II & Double modules)
25 November	First Opportunity Examinations end (Semester II & Double modules)
25 November	**End of 2nd Semester**
13 December	Academic Year ends & University closes (until 09 January 2012)
09 January 2012	University opens (2012 academic year)
10 January 2012	Second Opportunity Exams commence (Semesters I, II & Double modules)
19 January 2012	Academic staff resumes office duties
26 January 2012	Second Opportunity Examinations end (Semesters I, II & Double modules)

DEADLINES FOR THE 2011 ACADEMIC YEAR

(i) GENERAL

Last day for application of retention of continuous assessment mark ..... 18 February
Last day for application for exemption(s) ..... 18 February
Last day for Late Registration (*Late fee payable*) ..... 23 February
Last day for approval of exemption(s) ..... 23 February
Last day for approval of retention of continuous assessment mark ..... 23 February
Last day for approval of module(s) & qualification changes ..... 23 February
Last day to change Examination Centres at Regional Centres (Semester I modules) ..... 29 April
Last day for appeals (First Opportunity Examinations) (Semester I) ..... 29 July
Last day to submit outstanding documentation ..... 19 August
Last day to change Examination Centres at Regional Centres
(Semester II modules – 1st & 2nd Opportunity Examinations) ..... 23 September
Last day to cancel enrolment ..... 30 September
Last day for submission of Theses and Dissertations for examination ..... 18 November

(ii) CANCELLATIONS

Semester I modules
Last day to cancel Semester I modules ..... 06 May
Semester II modules
Last day to cancel Semester II modules ..... 30 September
Double modules (A double module normally extends over one academic year)
Last day to cancel Double modules ..... 30 September

(iii) FINANCE

Semester I modules
Last day to cancel with 100 % credit ..... 11 March
Last day to cancel with 50 % credit ..... 20 April
Semester II modules
Last day to cancel with 100 % credit ..... 05 August
Last day to cancel with 50 % credit ..... 02 September
Double modules (a double module normally extends over one academic year)
Last day to cancel with 100 % credit 11March
Last day to cancel with 50 % credit ..... 03 June

STRUCTURE AND PERSONNEL OF THE FACULTY

OFFICE OF THE EXECUTIVE DEAN

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

Executive Dean:	Dr M B Schneider: M.Sc.,Dr.phil. (Frankfurt/Germany), SACNASP, mbschneider@unam.na
Deputy Dean (Neudamm Campus):	Prof E Omoregie: B.Sc. (Univ of Jos, Nigeria); M.Sc. (Univ of Jos, Nigeria), M.Sc. (Portsmouth, UK), Ph.D (Univ of Jos, Nigeria), omoregie@unam.na
Deputy Dean (Ogongo Campus):	Prof L Kanyomeka: Dipl. Agric; B. Agric Sci; M. Sc. (Agron) University of Zambia; PhD (Pretoria), lkanyomeka@unam.na
Faculty Officer:	Mr E Nowaseb: B.A. (Augustana College, Rock Island, Illinois,USA)
Secretary:	Ms M T Cloete
Senior Researcher and Projects Coordinator:	Dr M B Schneider: M.Sc.,Dr.phil. (Frankfurt/Germany), SACNASP
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)
Library Assistant:	Mr E Thaniseb
Library Attendant:	Ms T Andowa
Student Support Officer:	Mr E Kuzatjike: B. A. (Tourism), UNAM ({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:	Prof E Omoregie: B.Sc. (Univ of Jos, Nigeria); M.Sc. (Univ of Jos, Nigeria), M.Sc. (Portsmouth, UK), Ph.D (Univ of Jos, Nigeria), omoregie@unam.na
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)
Cashier/Finance & Procurement:	Ms I W Brandt
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 M Katjirua
Assistant Supervisor:	Mr R Fredericks
Assistant Supervisor:	Mr R Kandjou
Secretary/Receptionist:	Ms A R Beukes

OGONGO CAMPUS

☎ (+264 65) 223 5000 🖷 (+264 65) 223 5302 💻 jkalimba@unam.na ✉ Private Bag 5520 Oshakati, Namibia

Deputy Dean:	Prof L Kanyomeka: Dipl. Agric; B. Agric Sci; M.Sc. (Agronomy) University of Zambia; PhD (Pretoria), lkanyomeka@unam.na
Farm & Campus Manager	Mr M Nghihangwa: Dipl. pA (Polytechnic of Namibia); B-Tech (Unisa); Cert Ad Ed (Unisa); MpA (UWC)
Campus Administrator:	Mr I Kalimba**:** (A+ Cert (UNAM), Cert Client Server Tech (India), Dipl Info Tech (N.C.I) Nam, Dipl IBM. (BMT College, SA)
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)
Subject Librarian	Ms N S T Uugwanga: Dip Information Studies (UNAM); B A Library Science & Records Management, History (UNAM)
Senior Library Assistant:	Mr J Kambuta
Library Attendant:	Ms S Shiimbi
Assistant Stores Controller:	Ms A Negwila
Finance and Procurement Officer:	Mr H Uupindi
Supervisor	Mr P Shikomba
Supervisor	Mr T Lwiinga
Supervisor	Mr F Ekondo
Supervisor	Mr M Shishwandu

Assistant Supervisor	Ms T Muhama
Assistant Supervisor	Mr D Shikola
Secretary / Receptionist:	Ms T Abed
Secretary / Receptionist:	Ms M A N Mandumbwa

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)

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

ACADEMIC DEPARTMENTS

DEPARTMENT OF AGRICULTURAL ECONOMICS

☎ (+264 61) 206 4015 🖷 (+264 61) 206 3013 💻 ecmusaba@unam.na ✉ Private Bag 13301, Windhoek, Namibia

Head of Department:	Dr E C Musaba
Lecturer:	Dr E C Musaba: B.Ag Sc (Zambia); M.Sc. (Guelph); PhD (Saskatchewan)
Lecturer:	Mr M M Eiseb: Dip Agric (Polytechnic); B.Sc, M.Sc. Agric Econ (Fort Hare)
Lecturer:	Ms C N Jona: B.Sc. Agric (UNAM); B.Sc. (Hons) Pretoria, M.Sc. Agric Extension (Pretoria)
Lecturer:	Mr S K Kalundu: NatDip Agric (Neudamm); B.Sc. Agric (UNAM); M.Sc. Agric Econ (Arkansas, USA)
Lecturer	Mr B Thomas: B.Sc. Agric (UNAM); M.Sc. Agric Econ (Stellenbosch)
Lecturer/Staff Dev Fellow:	Ms M Nandi: Dip Agric (Polytechnic); B.Agric Mgt (Natal); M.Sc.Dev Econ (Norway) Study leave (PhD Agric Econ, Free State)
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)
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

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

Head of Department:	Prof Irvin D.T. Mpofu
Professor:	Prof G P Kaaya: B.V.M., M.Sc. (Nairobi), PhD (Guelph, Canada).
Associate Professor:	Prof Irvin D.T. Mpofu: B.Sc. Animal Sci Hons (Zim), M.Sc. (Zim), PhD (Pretoria), MBA (Zim).
Senior Lecturer:	Dr S.T. Beyene: B.Sc. Agric (Alemaya), M.Sc. (Alemaya), PhD (Orange Free State).
Senior Lecturer:	Dr. E Lutaaya: B.Sc. Agric. (Makerere); M.Sc. (Texas A & M); PhD (Georgia).
Lecturer:	Dr. T O Itenge: B.Sc. Hons (Molecular Biology), Murdoch University, Western Australia; Graduate Cert. (Applied Science), Lincoln University, New Zealand; PhD (Molecular Genetics and Wool Science), Lincoln University, New Zealand
Lecturer:	Dr Michael E.Tukei: BVM (Makerere), Dip Tropical Vet Medicine, Free University Berlin, Germany; M.Sc. Veterinary Public Health & Food Hygiene, Free University Berlin; PhD (Microbiology), The University of Nottingham, UK.
Lecturer:	Mr. S P Muteka: B.Sc. (Concordia), M.Sc. (Pretoria).
Lecturer:	Ms. N P Petrus: B.Agric Animal Science Hons, University of Nigeria Nsukka (Nigeria); M.Sc. (CIRAD- Montpellie (France).
Lecturer:	Ms. B Claasen: B.Sc. Agric (Animal Science), UNAM; M.Sc. Agric (*cum laude*), Stellenbosch University.
Lecturer:	Ms. M Nepembe: M.Sc. Agric (Patrice Lumumba P F Univ).
Staff Dev Fellow:	Mr. C Mberema: B.Sc. Agric (UNAM); M.Sc. (Arizona) Study leave
Staff Dev Fellow:	Mr. G Tjiho: B.Sc. Agric (UNAM) Study leave
Tutor/Staff Dev Fellow:	Ms M. Shipandeni: B.Sc. Agric (UNAM) Study leave
Technologist:	Mr. L S Samunzala: National Dip. Agric., Neudamm, BBA (UNAM)
Technologist:	Ms S Hafeni: B.Sc. Agric (UNAM)

DEPARTMENT OF CROP SCIENCE (Ogongo Agricultural Campus)

☎ (+264 65) 223 5000 🖷 (+264 65) 223 5302 💻 jkaurivi@unam.na ✉ Private Bag 5520 Oshakati, Namibia

Head of Department:	Dr J Z U Kaurivi
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
Associate Professor:	Prof L Kanyomeka: Dip. Agric; B. Agric. Sc; M Sc. (Agron.) University of Zambia; PhD (Pretoria)
Lecturer:	Dr J Z U Kaurivi: B.Sc., (Natal); M.Sc., PhD: Soil, Water and Environmental Science (Arizona)
Lecturer:	Dr C Gwanama: B.AgricSc; M Sc (University of Zambia); PhD (Univ Orange Free State)
Lecturer:	Ms S Niitembu: MSc.(Patrice Lumumba); Diploma Animal Health, (Torgau,Leipzig)
Lecturer:	Mr J Chigariro: DipAgric (Gwebi Zim); Postgraduate Diploma Grain Storage Management (Greenwich University, UK); M.Sc. Grain Storage Management (Greenwich University, UK)
Lecturer:	Mrs. B. Kachigunda: BSc. (University of Zimbabwe) MSc. (University of Reading)
Lecturer:	Ms N Nghishitivali: M.Sc. Agric (Cuba)
Lecturer:	Mr F Shinombedi: M.Sc. Agric Eng (Czechelsovakia)
Lecturer:	Ms B. Mudamburi: Dip Agric (Chibero Zim), BSc. (Cranfield); MSc. (Wageningen)
Lecturer:	Mr S K Awala: National Dip Agric (Neudamm); B.Sc. Agric (UNAM), M. Agric. Sc. (Nagoya Univ., Japan)
Lecturer:	Mr P I Nanhapo: B.Sc. Agric (UNAM) M. Agric. Sc. (Nagoya Univ., Japan)
Lecturer:	Ms O T Shivolo: Dip Agric (OAC); B.Sc. Agric (UNAM), M.Sc. Crop Protection (University of Nairobi, Kenya)
Lecturer:	Mr G Hatutale: B.Sc. Agric (UNAM), M.Sc. Horticulture (Free-Sate Univ)
Assistant Lecturer:	Ms H Kandongo: B.Sc. Agric Mechanisation (Karl Marx University)
Technologist:	Ms A N Aluvilu: National Dip. Agric (Polytechnic of Namibia); B.Tech Agric (Cape Technikon), M. Agric (University of Limpopo)
Staff Dev Fellow:	Ms C Kamburona: B.Sc. Agric (UNAM); M.Sc. Genetics (Pretoria) Study leave
Staff Dev Fellow:	Mr P A Ausiku: National Dip Agric (Ogongo); B.Sc. Agric (UNAM) study leave

DEPARTMENT OF FOOD SCIENCE & TECHNOLOGY

☎ (+264 61) 206 3183 🖷 (+264 61) 206 3013 💻 nshigwedha@unam.na ✉ Private Bag 13301, Windhoek, Namibia

Head of Department:	Dr N Shigwedha
Senior Lecturer:	Dr P G Bille: Dip Dairy Technol (Egerton); B.Sc. Hons Dairy/Food Science & Technol (California); M.Sc. Dairy/Food Science & Technol (Belfast); PhD Food Science (Pretoria)
Lecturer:	Ms M N Nambabi-Shikongo: B.Sc Hons (Kent); M.Sc. (Brunel)
Lecturer:	Mr C Samundengu: B. Eng (Zambia); B. Eng Hons (Pretoria); M Eng (Pretoria)
Lecturer:	Dr N Shigwedha: B.Sc. Agric (UNAM); M.Sc., PhD (China)
Lecturer:	Mr S C Barrion: B.Sc. Agric (UNAM); B.Sc. Hons (Pretoria), M.Sc. Distinction (Pretoria)
Technologist:	Mr T N Tjaronda: Dip Lab Tech (Botswana); B Tech Biomedical Technology (Cape Peninsula University of Technology)
Staff Dev Fellow:	Ms P Hiwilepo: B.Sc. Agric (UNAM); M.Sc. Food Technology (Wageningen, The Netherlands) study leave
Staff Dev Fellow:	Ms N P Uusiku: B.Sc. Agric (UNAM): M.Sc. Food Sc (Stellenbosch) study leave

DEPARTMENT OF FISHERIES & AQUATIC SCIENCES

☎ (+264 61) 206 3171 🖷 (+264 61) 206 3462 💻 omoregie@unam.na ✉ Private Bag 13301, Windhoek, Namibia

Head of Department:	Prof E Omoregie
Professor:	Prof E Omoregie: B.Sc. (Univ of Jos, Nigeria); M.Sc. (Univ of Jos, Nigeria), M.Sc. (Portsmouth, UK), Ph.D (Univ of Jos, Nigeria)
Lecturer:	Mr L Kandjengo: B.Sc. (UNAM); B.Sc. (Hons), M.Sc. (Univ Cape Town)
Lecturer:	Mr S K Mafwila: B.Sc. (UNAM); PGDE (UNAM); B.Sc.Hons (Rhodes); M.Sc. (UCT)
Lecturer:	Mr J A Esterhuizen: B.Sc. (UNAM); B.Sc. Hons, M.Sc. (Rhodes)
Lecturer:	Mr A Samakupa: B.Sc (UNAM); Cert Quality Control (Univ Iceland); M.Sc. Fisheries Biology and Management (Bergen University)
Lecturer:	Mr M Tjipute: B.Sc. Astrakhan State Technical Univ, Russian Federation); M.Sc. (Russia)
Lecturer:	Mr F P Nashima: B.Sc. (UNAM); M.Sc. (UNAM)
Technologist:	Mr T Akawa: B.Sc. (UNAM)
Assistant Technologist:	Ms L Ekandjo: B.Sc. (UNAM)

DEPARTMENT OF INTEGRATED ENVIRONMENTAL SCIENCE (Ogongo Agricultural Campus)

☎ (+264 65) 223 5000 🖷 (+264 65) 223 5302 💻 andeinoma@unam.na ✉ Private Bag 5520 Oshakati, Namibia

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

Senior Lecturer:	Dr G Kopij: M.Sc. Animal Ecology (University of Wroclawski), PhD Ornithology (University of Orange Free State)
Lecturer:	Dr E Ndeunyema: National Dip Agric (OAC); B.Sc. Forestry (Wales Univ, Bangor); M.Sc. Agroforestry (Wales Univ, Bangor), PhD Forestry (Wales Univ, Bangor)
Lecturer:	Ms A Ndeinoma: National Dip Agric (OAC); B.Sc. Forestry, M.Sc. Environmental Impact Assessment (Stellenbosch); Postgraduate Diploma in Education (UNAM)
Lecturer:	Ms H Mavatera: B.Sc. Agric; M.Sc. Agric (CRUJ-ROMANIA)
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 N Siyambango: B.Sc. Environmental & Physiological and Molecular Biology (UNAM); Postgraduate Diploma in Environmental Management (University of Queensland); M.Sc. Environmental Management (University of Queensland)
Technologist:	Mr J Hambia: B.Sc. Natural Resources (UNAM)
Assistant 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)

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 FANR may offer the following diploma and degree programmes:

A.1.1 UNDERGRADUATE DIPLOMA PROGRAMMES

Qualification	Abbreviation	Minimum Duration
Diploma in Agriculture	Dipl Agric	3 years, *FT
Diploma in Natural Resources Management	Dipl Nat Res Mgt	3 years, *FT

A.1.2 UNDERGRADUATE DEGREE PROGRAMMES

Qualification	Abbreviation	Minimum Duration
Bachelor of Veterinary Medicine (Pre-Clinical Studies/Pre-Vet)	BVM (Pre-Vet)	2 years, *FT ({**new programme**})
Bachelor of Science in Agriculture	B Sc Agric	4 years, *FT
Bachelor of Science in Fisheries & Aquatic Sciences	B Sc FAS	4 years, *FT
Bachelor of Science in Integrated Environmental Science	B Sc Integrated Env Sci	4 years, *FT

Bachelor of Science in Agriculture and Bachelor of Science in Integrated Environmental Science degree programmes have a number of options which enable students to specialize in various fields of personal interest. The Faculty will advise the public which options will be offered at any given time.

A.1.3 POSTGRADUATE DEGREE PROGRAMMES

Qualification	Abbreviation	Minimum Duration
Master of Science in Rangeland Resources Management	M Sc RRM	2 years, *FT

FT = full-time studies

Apart from the above M Sc RRM 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 the diploma programmes shall be a Namibian Senior Secondary Certificate Ordinary Level (NSSC) or a recognized equivalent, provided that a candidate has passed five subjects with a minimum of 22 points on the UNAM Evaluation Point Scale, subject to performance using the following criteria:

A.2.1.2 Passes in:

i) English with a score of "D" or better; at NSSC (English as a Second Language);
ii) Mathematics with a score of "D" or better;
iii) Any two of the following three subjects with an "E" symbol or better (Biology, Physical Science and Agriculture); and
iv) Any fifth additional subject.

A.2.2 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 Faculty must have obtained a grade "C" or better in NSSC, or a recognized equivalent, in Biology and Mathematics, and not less than a grade "D" in Physical Science, or Chemistry. Candidates who meet the afore-mentioned criteria, but who might have obtained a "D" grade in Mathematics at NSSC or its equivalent, maybe admitted provided that they have scored a minimum of 27 points from five (5) subjects, including English, Biology, Mathematics and Physical Science or Chemistry, on the UNAM Evaluation Point Scale.

A.2.2.3 Candidates with a three-year Diploma in Agriculture, Forestry, Natural Resources or Fisheries and Marine/Aquatic Sciences with a combined average pass of 65% (i.e. credit pass), or higher from a recognized and accredited institution shall be granted admission to the first year B.Sc. degree programmes. Upon successful completion of the first year, such students maybe exempted from certain courses in the second and third year of their respective programmes, provided that the Faculty Board and the Senate of the University of Namibia are satisfied that the students will not gain any new knowledge by taking such courses which may be similar to courses they would have already taken at the diploma level.

A.2.2.4 Admission to the new **Bachelor of Veterinary Medicine (Pre-Clinical Studies / Pre-Vet)** Programme requires a "B" symbol pass in Biology, and "C" symbol passes in Mathematics and Physical Science at NSSC-O'Level or its equivalent in additional to the University general admission requirements contained in the **General Information and Regulations Prospectus**. Candidates with a three-year 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 first year BVM (Pre-Vet) degree programme at the discretion of the Faculty.

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

A.3.1 Candidates aspiring for admission to the Degree and Diploma programmes through the Mature Age Entry Scheme must satisfy the following conditions:

A.3.2 Should be at least 25 years old on the first day of the academic year in which admission is sought.

A.3.3 Should normally have successfully completed junior secondary education.

A.3.4 Should have proof of at least five years relevant work experience relating to the proposed study programme.

A.3.5 Applicants who have already attempted the Mature Age Entry Test twice without success, will not be considered under this scheme of entry.

A.3.6 The applicants will be required to complete Mature Age Entry Application Forms, and return them to the Office of the Registrar, accompanied by a Processing Fee (as stipulated in the Application Form). They will then sit for the Mature Age Entry Test, which will consist of three papers:

A.3.7 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 doing basic sciences and English communication modules within the Faculty of Science and the Language Centre at the University's Main Campus.

A.4.2 These modules are compulsory and have been designed to build a strong foundation in the basic sciences and also improve communication and study skills of the students before they embark on their professional courses. Unless otherwise stated, these modules will be offered by the Faculty of Science, as well as the Language Centre, on the Main Campus in Windhoek. The rules and regulations of the Faculty of Science and the Language Centre governing the conduct of lectures and examinations of the basic science and English communication modules to FANR students shall apply. For details please consult the Faculty of Science and Language Centre Prospectus.

A.4.3 Students will continue with their professional training in the Faculty at Neudamm or Ogongo Agricultural campus after their first year at the Main campus. For each of the three undergraduate degree programmes, nearly all modules in the second year shall be common to all students in these programmes and specialization will normally commence in the third year of the respective programmes.

A.4.4 The Faculty, in consultation with relevant Ministries, will play a significant role in advising students on the choice of options, taking into consideration the maximum places available in each option.

For the B.Sc. in Agriculture degree programme the following options will be offered:

- Agricultural Economics
- Animal Science
- Crop Science
- Food Science and Technology;

While B.Sc. Fisheries & Aquatic Sciences, B.Sc. Integrated Environmental Science and BVM (Pre-Vet) will be offered as separate degree programmes each.

A.5 PASS REQUIREMENTS

To proceed to second year, B Sc degree students must have fulfilled the following conditions:

A.5.1 A student must have passed more than two-third (i.e. 2/3 = 67%) of all the first year credits or modules.

A.5.2 A student who has passed more than 1/3 but less than 67% of the full first year credits or modules will be allowed to repeat the failed courses, but will not be allowed to proceed to the second year.

A.5.3 A student must have passed both Biology modules (i.e. Introduction to Biology and Diversity of Life) to be able to proceed to the second year.

A.5.4 A student must pass at least 1/3 of the full first year curriculum in order to re-register in the Faculty.

A.5.5 To proceed to the second and subsequent years, a Diploma student must have passed 60% of the credits taken during the year.

A.6 DURATION OF STUDY (UNDERGRADUATE PROGRAMMES)

A.6.1 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.6.2 The maximum period of full-time study for a Bachelor's degree or a Diploma, is the minimum period of study for that Degree/Diploma plus two years.

A.6.3 The maximum period of part-time study for a Bachelors Degree or a Diploma, is the minimum period of study for that Degree/Diploma plus four years.

A.7 MODULE STRUCTURE AND CODING

A.7.1 The Modular system has been used in the design of the modules in each programme. However, the Faculty of Agriculture and Natural Resources has gone further in weighting the modules using credit/units to put more meaning to the module. All modules except for those offered in the Faculty of Science have each been given a unit weighting according to the time devoted to it. In this system, 14 one hour lectures, or 28 hours practical sessions, constitute one credit/unit. For example a module consisting of 28 one-hour lectures and 14 two hour practical classes would be a three credit module.

A.7.2 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), AEN (Agricultural Engineering){Part of Crop Science Dept}, ASC (Animal Science) CSC (Crop Science), NRF (Fisheries & Aquatic Sciences)), FST (Food Science and Technology), IES (Integrated Environmental Science Dept). The three alpha codes are followed by four numeric codes denoting the following:

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

A.7.3 A module may consist entirely of lectures, field work, project work or seminars. In addition to work during the term, a module may include prescribed fieldwork or assignments during University vacations. Tutorials will be offered in all terms and shall be compulsory.

A.7.4 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.7.5 A student may, with the approval of the Faculty and Department, take modules from other Faculties with the provision that doing so will not affect his or her programme of study.

A.8 FIELD ATTACHMENT REGULATIONS

A.8.1 A student shall have to pass the first year of the Diploma or first year of the Degree study to qualify for the first field attachment. Similarly, second year Diploma and second year Degree students will be required to pass their year of study to be allowed to do the second field attachment.

A.8.2 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.8.3 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.9 ASSESSMENT

A.9.1 The Common Rules and Regulations of the University of Namibia governing evaluation of a student's performance shall apply. Evaluation of a student's performance shall be based on continuous assessment and examinations. An examination paper shall normally be a formal written examination of one and a half hours duration for courses of no more than 2 credits and of up to 3 hours for courses of more than 2 credits. Field attachment and modules that are wholly practical in nature shall be rated by continuous assessment. They may include orals, reports and presentations as appropriate. In order to pass a course, a student must obtain a final mark of at least 50%.

A.9.2 Unless otherwise stipulated in these regulations, the 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 whilst examination will constitute a weighting of 40% of the final mark for modules consisting of lectures and practicals.
UNDERGRADUATE PROGRAMMES
Continuous assessment will constitute a weighting of 40% of the final mark whilst the examination will constitute a weighting of 60% of the final mark for modules consisting of lectures and practicals.

A.9.3 Continuous assessment will include at least two tests and one assignment, including practical reports. For field attachment modules, an attachment report and an oral presentation shall constitute the total assessment mark.

A.9.4 A student may be allowed to sit for supplementary examinations if he/she obtains a marginal fail mark of 45 - 49% in not more than five modules. The maximum score awarded for a supplementary examination will be 50%. A student who fails a supplementary examination shall repeat the failed module.

A.9.5 B.Sc. degree student:

1) who has passed ½ or more modules in a year and obtains less than 45% marks in the failed courses shall repeat the failed courses;

2) will only be allowed to take modules in subsequent years if the pre-requisites have been passed.

A.9.6 To proceed to the second year, an undergraduate B Sc degree student must have passed more than two-thirds (i.e. 2/3 = 67%) of all the first year credits or modules, including passes in Introduction to Biology (BLG 3411) and Diversity of Life (BLG 3512).

A.9.7 B.Sc. degree student will only be permitted to proceed to the third year of study when all the modules in the first and second year have been successfully completed, or when not more than three (3) modules are being carried forward.

A.9.8 B.Sc. degree student may be allowed to proceed from third year to the fourth year of study if:

1) He/She has passed all the modules examined during the year;

2) After supplementary examinations, he/she has passed at least 75% of the credits taken during the year.

A.10 REPEAT AND DISCONTINUATION

A.10.1 A student who has passed more than 40% but less than 60% of the full diploma credits for each academic year will be allowed to repeat the year.

A10.2 A student who has passed more than a 1/3 [33%], but less than 67% of the full first year B.Sc. degree credits or modules will be allowed to repeat the year.

A.10.3 A student who has passed more than a 1/3 [33%], but less than 60% of the full second or third year B.Sc. degree credits or modules will be allowed to repeat the year.

A.10.4 A student who fails in more than 2/3 [67%] (for B.Sc. degree) and 60% (for diploma) of the full academic year credits will be discontinued.

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 courses taken during the programme;
(ii) Have completed and passed all field practical training courses.

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

B. DIPLOMA IN AGRICULTURE ({Neudamm & Ogongo Campus})

B.1 FIRST YEAR

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
ULEG	2410	English for General Communication	4	04/56	0	16
UCLC	3409	Computer Literacy	4	02/28	42	8
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
AGEC	2411	Mathematics and Basic Statistics	4	04/56	21	16
AASC	2401	Biology	4	02/28	14	8
AASC	2411	Physical Science	4	04/56	21	16
AACA	2400	Farm Duties I	4	0	49	8
TOTAL SEMESTER 1 CREDITS						**80**
Semester 2						
ULEG	2310	English for General Communication	3	04/56	0	16
AGEC	2402	Basic Economics	4	02/28	14	8
AGEC	2422	Communication and Information Systems	4	02/28	14	8
AASC	2412	Animal Nutrition and Feeding	4	04/56	21	16
ACSC	2412	Principles of Crop Production	4	04/56	21	16
AIES	2442	General Ecology	4	02/28	14	8
AACA	2400	Farm Duties I	4	0	49	8
TOTAL SEMESTRER 2 CREDITS						**80**
TOTAL FIRST YEAR CREDITS						**160**

B.2 SECOND YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	2501	Financial Management	5	02/28	14	8
AGEC	2521	Introduction to Rural Sociology	5	02/28	14	8
AASC	2511	Range Management	5	04/56	21	16
AASC	2531	Animal Anatomy, Physiology & Reproduction	5	04/56	21	16
ACSC	2511	Crop Protection	5	04/56	21	16
AACA	2500	Farm Duties II	5	0	49	8
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
AGEC	2502	Introduction to Social Research Methods	5	02/28	14	8
AASC	2512	Applied Animal Health	5	04/56	21	16
AASC	2502	Applied Animal Breeding	5	02/28	21	8
AASC	2522	Skin and Fibre Production	5	02/28	21	8
ACSC	2512	Soil Science	5	04/56	21	16
ACSC	2502	Farm Technology I	5	02/28	14	8
AACA	2500	Farm Duties II	5	0	49	8
TOTAL SEMESTER 2 CREDITS						**72**
TOTAL SECOND YEAR CREDITS						**144**

B.3 THIRD YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	2601	Extension Methods	6	02/28	14	8
AGEC	2621	Marketing, Trade and Policy	6	02/28	14	8
AASC	2611	Intensive Animal Production	6	04/56	21	16
ACSC	2601	Water Management & Soil Conservation	6	02/28	14	8
ACSC	2611	Vegetable & Fruit Production	6	04/56	21	16
AACA	2601	Field Attachment	6	0	0	8
AACA	2600	Special Study	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
AGEC	2602	Project Management	6	02/28	14	8
AGEC	2622	Entrepreneurship	6	02/28	14	8
AASC	2602	Game Farming	6	02/28	21	8
AASC	2612	Extensive Animal Production	6	04/56	21	16
ACSC	2612	Farm Technology II	6	04/5	21	16
ACSC	2602	Crop Production	6	02/28	21	8
AACA	2600	Special Study	6	02/28	21	8
TOTAL SEMESTER 2 CREDITS						**72**
TOTAL THIRD YEAR CREDITS						**144**

B.4 MODULE PRE- & CO-REQUISITES

NQF Level	MODULE	PRE-REQUISITE	CO-REQUISITE
5	AGEC 2502: Introduction to Social Research Methods	AGEC 2411: Mathematics & Basic Statistics	
	AASC 2511: Range Management	AIES 2442: General Ecology	
	AASC 2531: Animal Anatomy, Physiology & Reproduction	AASC 2401: Biology	
	AASC 2512: Applied Animal Health	AASC 2401: Biology & AASC 2411: Physical Science	
	AASC 2522: Skin & Fibre Production	AASC 2401: Biology	
	ACSC 2502: Farm Technology I	AGEC 2411: Mathematics & Basic Statistics	
6	AGEC 2601: Extension Methods	AGEC 2422: Communication & Information Systems and AGEC 2521: Introduction to Rural Sociology	
	AGEC 2621: Marketing, Trade & Policy	AGEC 2402: Basic Economics	
	AGEC 2602: Project Management	AGEC 2501: Financial Management	
	AGEC 2622: Entrepreneurship	AGEC 2501: Financial Management	
	ACSC 2601: Water Management & Soil Conservation	ACSC 2502: Farm Technology I	
	ACSC 2602: Crop Production	ACSC 2412: Principles of Crop Production	
	AACA 2610: Special Study	AGEC 2502: Introduction to Social Research Methods	

B.5 MODULE DESCRIPTORS

B.5.1 FIRST YEAR MODULES

B.5.1.1 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.

B.5.1.2 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

B.5.1.3 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None

Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

B.5.1.4 AGEC 2411: MATHEMATICS AND BASIC STATISTICS

Module title: **MATHEMATICS AND BASIC STATISTICS**
Subject code: AGEC 2411
NQF level: 4
Contact hours: Lectures: 4 hour/week, and Practical: 2 hours /week
Credits: 16
Module assessment: Continuous assessments 60% (minimum 2 test, and 3 assignment) Examination 40% (1 x 3 hour examination paper)
Module description (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.

B.5.1.5 AASC 2401: BIOLOGY

Module title: **BIOLOGY**
Code: AASC 2401
NQF level: 4
Contact hours: 2 lecture periods/week for 14 weeks; 3 hours practical alternative week.
Credits: 8
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper)
Prerequisites: None
Module description (Content):
This module covers characteristics of living organisms; Overview of the five major kingdoms (Monera, Protista, Fungi, Plantae, Animalia) and Viruses; Chemical basis of life; Introductory structure of macromolecules (carbohydrates, lipids, proteins and nucleic acids) and their functions; Importance of carbohydrates, lipids, proteins, vitamins and minerals in animal nutrition; Prokaryotic and eukaryotic cells; Differences between plant and animal cells; Cell cycle; Mitosis and Meiosis; Sexual and asexual reproduction; Basic concepts of Mendelian genetics; Tissues, organs and systems in animals; Enzymes as catalysts; Photosynthesis; Osmosis & diffusion; Cell respiration; Monocotyledons and dicotyledons; Basic plant anatomy and physiology; External and internal plant morphology; Passive and active transport; Concept of evolution; Introduction to ecology, ecosystems and communities; Naming of ecosystems and communities; Food chain and food web; Interrelationships among organisms; The cycling of matter in ecosystems (water, carbon and nitrogen cycles).

B.5.1.6 AASC 2411: PHYSICAL SCIENCE

Module title: **PHYSICAL SCIENCE**
Code: AASC 2411
NQF level: 4
Contact hours: 4 lecture periods/week for 14 weeks; 3 hours practical every week.
Credits: 16
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper)
Prerequisites: None
Module description (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

B.5.1.7 AACA 2400: FARM DUTIES I

Module title: **FARM DUTIES**
Subject code: AACA 2400
NQF Level: 4
Contact hours: Practical: 7 hours (one full day) on alternating weeks for 28 weeks Total: 98 hours
Credits: 16
Module Assessment: Assessment will be based on attendance at duty stations.
Prerequisite: None
Module Description (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 Neudamm and 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 (5 credits at level 5) 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).

B.5.1.8 AGEC 2402: BASIC ECONOMICS

Module title: **BASIC ECONMICS**
Subject code: AGEC 2402
NQF level: 4
Contact hours: Lectures: 2 hours/ week and Practicals: 2hours/week for 14 weeks weeks
Credits: 8
Module assessment: One Exam Paper (3hrs) 40%, 2 Tests, 3 Assignments and Practicals 60%
Module description (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; National accounts; Components of national income and expenditure; Government taxation in Namibia; Money, Banking and interests; Consumer price Index (CPI); Inflation and deflation; Unemployment; The contribution of agriculture to the national economy; International trade and comparative advantage.

B.5.1.9 AGEC 2422: COMMUNICATION AND INFORMATION SYSTEMS

Module Title: **COMMUNICATION AND INFORMATION SYSTEMS**
Subject code: AGEC 2422
NQF level : 4
Contact hours: Lectures: 2 hours/week and Practicals 2 hours/week for 14 weeks
Credits: 8
Module assessment: Continuous assessment One Exam Paper (3hrs) 40%, 2 Tests, 2 Assignments and Practicals 60%
Module description (Content):
Theory of communication; the nature and importance of communication; Source Message Channel and Receiver (SMCRE) communication models: verbal and non verbal modes communication; writing informative articles and pamphlets for farmers; extension campaigns; organisation of agriculture show; and farmers day; effective speaking; presentation and use of common types of audio visual aids ; managing conflict and negotiation skills

B.5.1.10 AASC 2412: ANIMAL NUTRITION AND FEEDING

Module title: **ANIMAL NUTRITION AND FEEDING**
Code: AASC 2412
NQF level: 4
Contact hours: 4 lecture periods/week for 14 weeks; 3 hours practical every week.
Credits: 16
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3hour examination paper).
Prerequisites: None
Module description (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.

B.5.1.11 ACSC 2412: PRINCIPLES OF CROP PRODUCTION

Module Title: **PRINCIPLES OF CROP PRODUCTION**
Code: ACSC 2412
NQF level: 4
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week alternating for 14 weeks
Credits: 16
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments), Examination 40 % (1x3 hour examination paper)
Module description (Content):
Crop environment in Namibia. Botany of crops—Plant structure: cells, tissues and organs; Plant function and growth processes; classification of plants; plant reproduction. Soil textural classification, soil physical and chemical properties, soil fertility. Cropping systems, tillage and crop establishment. Fertilization and management practices.

B.5.2 SECOND YEAR MODULES

B.5.2.1 AGEC 2501: FINANCIAL MANAGEMENT

Module title: **FINANCIAL MANAGEMENT**
Subject code: AGEC 2501
NQF level: 5
Contact hours: Lectures: 2 hours/week for 14 weeks, Practicals: 2hours/week for 14 weeks
Credits: 8
Module assessment: 60% Continuous assessment (at least 2 tests, 2 assignments), 40% Examination (One 3 hour paper)

Module description (Content):
Principles of financial Management; Budgeting and Record keeping; Risk management; Investment Analysis; Depreciation and Asset valuation; Financial Statements Analysis, Leasing and renting of equipments or assets; Income tax and Estate planning and legal aspects of borrowing and sources and terms of agricultural loans.

B.5.2.2 AGEC 2521: INTRODUCTION TO RURAL SOCIOLOGY

Module title: **INTRODUCTION TO RURAL SOCIOLOGY**
Subject code: AGEC 2521
NQF level: 6
Contact hours: Lectures: 2 hours/week and Practicals: 2 hours/week for 14 weeks
Credits: 8
Module assessment Continuous assessment 60% (minimum 2 tests, 2 assignments) One Exam Paper (3hrs) 40%
Module description (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; 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.

B.5.2.3 AASC 2511: RANGE MANAGEMENT

Module title: **RANGE MANAGEMENT**
Code: AASC 2511
NQF level: 5
Contact hours: 4 lecture periods/week for 14 weeks; 3 hours practical every week.
Credits: 16
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper).
Prerequisites: AIES 2442 General Ecology
Module description (Content):
This module develops the students' understanding, skills and attitude regarding range and pasture management through taking into account major and minor topics like: Pastures and range in Namibia: roles, basic terminologies & background information on rangelands; Namibian range types i.e. sweet, sour & mixed veld and characteristics; Overview of the carrying capacity of Namibian range types; Morphology of common range plants: structure of a grass plant including inflorescence, node, internodes and leaf blade; Flowering, stem & leave development, elongation and tillering; Growth cycle of plants and plant & seed dormancy; Taxonomy & nomenclature: Objectives of plant taxonomy; sources of taxonomic evidence e.g. embryology, cytology & chemosystematics; Introduction to systematic botany with special focus on Annuals & Perennials range plants including herbs, grasses, shrubs, trees & bushes; Plant succession & retrogression: Types of succession including pioneer, sub-climax & climax processes; Retrogression & die-back rate of selected range plants; Factors influencing succession; State & transition models; Animal-plant interactions on range: Animal-plant interface i.e. herbivory and trampling; 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: Principles & practices; Opportunistic grazing management; Continuous and rotational including multi-camp, non-selective & controlled selective grazing; Deferment; Zonal/centripetal grazing; Range degradation: Bush encroachment, overgrazing, desertification & erosion; Land reclamation/restoration. Range evaluation & monitoring: Range condition & trend assessment; Carrying capacity determination – employing conventional & new methods incl. BECVOL; Integrated feed budgeting and fodder flow planning: cultivated pastures, fodders & forage conservation; Establishment (incl. species selection), management & use of cultivated pastures; Characteristics of selected species for cultivation; Conservation of forage e.g. hay and silage making, *in situ* conservation.

B.5.2.4 AASC 2531: ANIMAL ANATOMY, PHYSIOLOGY AND REPRODUCTION

Module title: **ANIMAL ANATOMY, PHYSIOLOGY AND REPRODUCTION**
Code: AASC 2531
NQF level: 5
Contact hours: A. Theory: 4 hours/week for 14 weeks. B. Practical 3 hours every alternate week
Credit: 16
Module Assessment: Continuous assessment 60% (2 tests and at least 3 practicals / assignments / quizzes). Examination 40% (1 x 3hour examination paper).
Pre-requisites: AASC 2401: Biology
Module Description (Content): This module covers the following aspects: morphology and Function of the reproductive system, circulatory, respiratory, nervous, skeletal, and urinary and digestive systems of farm animals (ruminants, mono-gastric animals, and poultry), their anatomical and functional interrelationships. Practical classes which will involve the use of carcass dissections, examination of internal organs in dead animals, and the study of laboratory models, will help in the understanding of the anatomical structures and the interrelationship between organic systems. Artificial insemination will also be coved in this Module.

B.5.2.5 ACSC 2511: CROP PROTECTION

Module Title: **CROP PROTECTION**
Code: ACSC 2511
NQF level: 5
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week alternating for 14 weeks
Credits: 16
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments); Examination 40 % (1x3 hour examination paper)
Module description (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.

Methods of crop protection and their application. Integrated pest management. Pesticide handling and safety. Crop protection legislation in Namibia and International guidelines.

B.5.2.6 AACA 2500: FARM DUTIES II

Module title: **FARM DUTIES**
Subject code: AACA 2400
NQF Level: 4
Contact hours: Practical: 7 hours (one full day) on alternating weeks for 28 weeks. Total: 98 hours
Credits: 16
Module Assessment: Assessment will be based on attendance at duty stations.
Prerequisite: None
Module Description (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 Neudamm and 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 (5 credits at level 5) 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).

B.5.2.7 AGEC 2502: INTRODUCTION TO SOCIAL RESEARCH METHGODS

Module title: **INTRODUCTION TO SOCIAL RESEARCH METHODS**
Subject Code: 2502
NQF Level: 5
Contact Hours: Lectures: 2hours/ week and Practical: 2hours/alternate week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment 60% (at least 2 tests and 2 assignments) One Exam Paper (3Hrs) 60%
Pre-requisite: AGEC 2411: Mathematics and Basic Statistics
Module Description (Content): Introduces the student to social research methods commonly used in agriculture. It covers definitions of research, agricultural research, types of data, socio-economic indicators and indexes. 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, Participatory research approaches (e.g. Rural Rapid Appraisal (PRA)), Case study approach, and Participant observation. Exploratory analysis and estimation (descriptive statistics);

B.5.2.8 AASC 2512: APPLIED ANIMAL HEALTH

Module title: **APPLIED ANIMAL HEALTH**
Code: AASC 2512
NQF level: 5
Contact hours: 16
Module Assessment: Continuous assessment 60% (2 tests and at least 3 practicals / assignments / quizzes). Examination 40% (1 x 3hour examination paper).
Prerequisites: AASC 2401: Biology and AASC 2411: Physical Science
Module Description (Content):
Concepts of health and disease, disease development and body response in livestock. Introduction to Bacteriology, Virology, Parasitology, Toxicology, Pharmacology and Epidemiology of Disease. Notifiable diseases coursed by bacteria, viruses, fungi and yeast. Congenital and environmental induced defects. Important economic and zoonotic diseases of domestic animals. Common diseases of cattle, sheep, goats, pigs and poultry in Namibia. Actual activities pertaining to animal health (Restraint of animals, clinical examination, specimen collection, hygiene and sanitation) as performed by veterinarian and technicians on the farm as well as manipulating laboratory techniques necessary for diagnosing diseases of domestic animals. .

B.5.2.9 AASC 2502: APPLIED ANIMAL BREEDING

Module title: **APPLIED ANIMAL BREEDING**
Code: AASC 2502
NQF level: 5
Contact hours: 3 lecture periods/week for 14 weeks; 3hours practical every other week.
Credits: 8
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper)
Prerequisites: None
Module description (Content): This module covers the application 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

B.5.2.10 AASC 2522: SKIN AND FIBRE PRODUCTION

Module title: **SKIN AND FIBRE PRODUCTION**
Code: AASC 2522
NQF level: 5

Contact hours: A. Theory: 2 hours/week for 14 weeks. B. Practical 3 hours every alternate week
Credit: 8
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper)
Pre-requisites: AASC 2401: Biology
Module Description (Content): Characteristics, requirements and constraints of skin and fibre production systems in Namibia. Breeds of pelt- and hair-producing sheep and goats and their adaptability. Facilities and handling. Histology of the skin, fibre and fleece properties, lamb and pelt description (boniture), photography and judging. Genetic factors affecting pelt, fibre and fleece properties. Management: sexual activity and fertility, flock composition, management targets and calendar. Farm processing, tanning of skins and hides. Product quality. Economics of and factors affecting skin and fibre production in Namibia, including legal framework. Record keeping. Future prospects.

B.5.2.11 ACSC 2512: SOIL SCIENCE

Module Title: **SOIL SCIENCE**
Code: ACSC 2512
NQF level: 5
Contact hours: Lectures: 4 hours/week for 14 weeks. Practical: 3 hours/week alternating for 14 weeks
Credits: 16
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments) Examination 40 % (1x3 hour examination paper)
Module description (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, structure, profile, water holding capacity, cation exchange. Soil nutrients for plant growth: nutrient content and nutrient availability. Movement and availability of soil water. Soil conditions: acidity, salinity, compaction. Inorganic and organic fertilizers. Soil types of Namibia. Agro-ecological zones of Namibia.

B.5.2.12 ACSC 2502: FARM TECHNOLOGY I

Module Title: **FARM TECHNOLOGY I**
Code: ACSC 2502
NQF level: 5
Contact hours: Lectures: 2 hours/week for 14 weeks. Practical: 2 hours/week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments). Examination 40 % (1x3 hour examination paper)
Pre-requistes: AGEC 2411: Mathematics & Basic Statistics
Module description (Content):
Workshop safety, workshop materials, technical drawing. Workshop equipment. Joining and assembly of metal and nonmetals. Internal combustion engines. Tractors and tractor maintenance. Tillage equipment, crop protection and harvesting equipment. Farm machinery management. Animal draft power in Namibia. Selection, training and maintenance of draft animals. Animal drawn implements.

B.5.3 THIRD YEAR MODULES

B.5.3.1 AGEC 2601: EXTENSION METHODS

Module Title: **EXTENSION METHODS**
Subject code AGEC 2601
NQF level 6
Contact hours Lectures: 3 hours/week and Practicals 3 hour/week for 14 weeks
Credits 8
Module assessment : Continuous assessment 60% (minimum 2 tests, 2 assignments) Exam Paper (3hrs) 40%
Pre-requisite: AGEC 2422: Communication & Information Systems and AGEC 2521: Introduction to Rural Sociology
Module description (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; plan of work coordination supervision and administration feedback and evaluation procedure

B.5.3.2 AGEC 2621: MARKETING, TRADE AND POLICY

Module title: **MARKETING, TRADE AND POLICY**
Subject code AGEC 2621
NQF level: 6
Credits: 8
Contact hours: Lectures: 2 hours/week and Practicals: 1.5 hours/week for 14 weeks
Module assessment : Continuous assessment 60% (minimum 2 tests and 2 assignments) One Exam Paper (3hrs) 40%
Pre-requisite: AGEC 2402: Basic Economics
Module description (Content):
Introduction to agricultural marketing; Marketing function 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 contracts markets) and strategies; Market structures; Government interventions in agricultural marketing- the National Agricultural Policy, credit policy; International agricultural trade and the gains and loss of trade; Differences between domestic, and regional.

B.5.3.3 AASC 2611: INTENSIVE ANIMAL PRODUCTION

Module title: **INTENSIVE ANIMAL PRODUCTION**
Code: AASC 2611
NQF level: 6
Contact hours: 4 lecture periods/week for 14 weeks; 3hours practical every other week.
Credits: 16
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper).
Prerequisites: None
Module description (Content): This Module covers current status of dairy cattle, pigs, poultry and ostriches production in Namibia; Characteristics and constraints of intensive animal production systems in Namibia; Efficiency of production; Breeds of dairy cattle, pigs, poultry and ostriches; Management of dairy cattle, pigs, poultry and ostriches in different stages of production; Housing: reasons for housing and essential features required; Nutrients requirement for dairy cattle, pigs, poultry and ostriches in different stages of production; Processing, preservations and storage of animal products; Transportation and animal welfare; Slaughtering and product quality; Marketing of animals products; Record keeping; Future prospects.

B.5.3.4 ACSC 2601: WATER MANAGEMENT AND SOIL CONSERVATION

Module Title: **WATER MANAGEMENT AND SOIL CONSERVATION**
Code: ACSC 2601
NQF level: 6
Contact hours: Lectures: 2hours/week for 14 weeks
Practical: 2 hours /week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments). Examination 40 % (1x3 hour examination paper)
Pre-requsites: ACSC 2502: Farm Technology I
Module description (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. 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.

B.5.3.5 ACSC 2611: VEGETABLE AND FRUIT PRODUCTION

Module Title: **VEGETABLE AND FRUIT PRODUCTION**
Code: ACSC 2611
NQF level: 6
Contact hours: Lectures: 4hours/week for 14 weeks. Practical: 3 hours / week alternating for 14 weeks
Credits: 16
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments).Examination 40 % (1x3 hour examination paper)
Module description (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: citrus, mangoes, pawpaw, grapes, peaches, figs, dates. Soil and climatic requirements, establishment, management practices, harvesting and post-harvest technology.

B.5.3.6 AACA 2601: FIELD ATTACHMENT

Module title: **FIELD ATTACHMENT**
Subject code: AACA 2601
NQF Level: 6
Contact hours: Lecture: 21 hours per three years
Practical: 6 weeks per three years
Credits: 8
Module Assessment: Continuous assessment during site inspection. Assessment of field report and assessment of oral presentation.
Module Description (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 will consist of on-site inspection, a report by the field supervisor and a written report and oral presentation by the student.

B.5.3.7 AACA 2600: SPECIAL STUDY

Module title: **SPECIAL STUDY**
Subject code: AACA 2600
NQF Level: 6
Contact hours: Lecture: 2 hours per week for 28 weeks. Practical: 3 hours per week for 28 weeks
Credits: 16
Module Assessment: Assessment will be based on written report (50%) and assessed by the supervisor and one other lecturer, an oral presentation (30% assessed by all lecturers) and Assignments.
Module Description (Content):
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.

B.5.3.8 AGEC 2602: PROJECT MANAGEMENT

Module title: **PROJECT MANAGEMENT**
Subject Code: 2602
NQF Level: 6
Contact Hours: Lectures: 2hours/ week for 14 weeks and Practical: 2hours/week for 7 weeks
Credits: 8
Module Assessment: Continuous assessment 60% (minimum 2 tests and 2 assignments) One Exam Paper (3Hrs) 40%
Pre-requisite: AGEC 2501: Financial Management
Module Description (Content):
Project as 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.

B.5.3.9 AGEC 2622: ENTREPRENEURSHIP

Module Name: **ENTREPRENEURSHIP**
Subject Code: AGEC 2622
NQF Level: 6
Contact Hours: Lectures: 2 hours/ week and Practicals 1.5 hours/ alternate week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment 60% (minimum 2 tests 2 assignments), One Exam Paper (3 hours) 40%
Pre-requisite: AGEC 2501: Financial Management
Module Description (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.

B.5.3.10 AASC 2602: GAME FARMING

Module title: **GAME FARMING**
Code: AASC 2602
NQF level: 6
Contact hours: 2 lecture periods/week for 14 weeks; 3 hours practical every other week.
Credits: 8
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper). Examination 60% (1 x 3hour examination paper)
Prerequisites: None
Module description (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.

B.5.3.11 AASC 2612: EXTENSIVE ANIMAL PRODUCTION

Module title: **EXTENSIVE ANIMAL PRODUCTION**
Code: AASC 2612
NQF level: 6
Contact hours: 4 lecture periods/week for 14 weeks; 3hours practical every other week.
Credits: 16
Module assessment: Continuous assessment 60% (2 tests and at least 3 practical reports or assignments). Examination 40% (1 x 3 hour examination paper).
Prerequisites: None
Module description (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.

B.5.3.12 ACSC 2612: FARM TECHNOLOGY II

Module Title: **FARM TECHNOLOGY II**
Code: ACSC 2612
NQF level: 6
Contact hours: Lectures: 4 hours/week for 14 weeks. Practical: 3 hours/week alternating for 14 weeks
Credits: 16
Module assessment: Continuous assessment 60 % (2 tests, practical and 3 assignments). Examination 40 % (1x3 hour examination paper)
Module description (Content):
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. 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, traverse

B.5.3.13 ACSC 2602: CROP PRODUCTION

Module Title:	**CROP PRODUCTION**
Code:	ACSC 2602
NQF level:	6
Contact hours:	Lectures: 2 hours/week for 14 weeks. Practical: 3 hours/week alternating for 14 weeks
Credits:	8
Module assessment:	Continuous assessment 60 % (2 tests, practical and 3 assignments). Examination 40 % (1x3 hour examination paper)
Pre-requisites:	ACSC 2412: Principles of Crop Production

Module description (Content):

Crop production practices: land preparation, cropping systems, weed, pest and disease control, harvesting and post-harvest technology. Importance, soil and climatic requirements and management practices for cereals (maize, millet, sorghum, wheat, rice); legumes (groundnuts, bambara groundnuts, cowpeas), fibre crops (cotton), oil seed crops (soybean, sunflower, castor), root and tuber crops (Irish potato, sweet potato, cassava).

C. DIPLOMA IN NATURAL RESOURCES MANAGEMENT ({Ogongo Campus})

C.1 FIRST YEAR

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
ULEG	2410	English for General Communication	4	04/56	0	16
UCLC	3409	Computer Literacy	4	02/28	42	8
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
AGEC	2411	Mathematics and Basic Statistics	4	04/56	21	16
AASC	2401	Biology	4	02/28	14	8
AASC	2411	Physical Science	4	04/56	21	16
AACA	2400	Farm Duties I	4	0	49	8
TOTAL SEMESTER 1 CREDITS						**80**
Semester 2						
ULEG	2410	English for General Communication	4	04/56	0	16
AIES	2402	Nursery Management	4	02/28	21	8
AIES	2422	Plant Taxonomy	4	02/28	21	8
AIES	2442	General Ecology	4	02/28	14	8
AGEC	2402	Basic Economics	4	02/28	14	8
AGEC	2422	Communication and Information Systems	4	02/28	14	8
ACSC	2412	Principles of Crop Production	4	04/56	21	16
AACA	2400	Farm Duties I	4	0	49	8
TOTAL SEMESTRER 2 CREDITS						**80**
TOTAL FIRST YEAR CREDITS					**160**	

C.2 SECOND YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AIES	2511	Plant Entomology and Pathology	5	04/56	21	16
AIES	2531	Introduction to Agroforestry	5	04/56	21	16
AIES	2501	Vegetation Assessment and Monitoring Techniques	5	02/28	14	8
AIES	2521	Wildlife Survey Techniques and Monitoring	5	02/28	21	8
AGEC	2501	Financial Management	5	02/28	14	8
AGEC	2521	Introduction to Rural Sociology	5	02/28	14	8
AACA	2500	Farm Duties II	5	0	49	8
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
AIES	2512	Forest and Veld Fire Management	5	04/56	21	16
AIES	2532	Silviculture	5	04/56	21	16
AGEC	2502	Intro to Social Research Methods	5	02/28	14	8
ACSC	2512	Soil Science	5	04/56	21	16
ACSC	2502	Farm Technology I	5	02/28	14	8
AACA	2500	Farm Duties II	5	0	49	8
TOTAL SEMESTER 2 CREDITS						**72**
TOTAL SECOND YEAR CREDITS						**144**

C.3 THIRD YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AIES	2611	Forest Resource Utilization & Harvesting Techniques	6	04/56	21	16
AIES	2631	Community Based Natural Resource Management	6	04/56	21	16
AIES	2601	Principles of Beekeeping	6	02/82	14	8
AGEC	2601	Extension Methods	6	02/28	14	8
ACSC	2601	Water Management and Soil Conservation	6	02/28	14	8
AACA	2601	Field Attachment	6	0	0	8
AACA	2600	Special Study	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
AIES	2602	Introduction to Natural Resource Economics	6	02/28	21	8
AIES	2612	Integrated Natural Resource Mgt and Planning	6	04/56	21	16
AIES	2622	Natural Resource Policies and Administration	6	02/28	21	8
AGEC	2602	Project Management	6	02/28	14	8
ACSC	2612	Farm Technology II	6	04/56	21	16
ACSC	2602	Crop Production	6	02/28	21	8
AACA	2600	Special Study	6	02/28	21	8
TOTAL SEMESTER 2 CREDITS						**72**
TOTAL THIRD YEAR CREDITS						**144**

C.4. MODULE PRE- & CO-REQUISITES

NQF Level	MODULE	PRE-REQUISITE	CO-REQUISITE
5	AIES 2531: Introduction to Agroforestry	ACSC 2412: Principles of Crop Production	
	AIES 2501: Vegetation Assessment & Monitoring Techniques	AIES 2442: General Ecology	
	AIES 2512: Forest and Veld Fire Management	AIES 2442: General Ecology	
	AIES 2532: Silviculture	AIES 2402 :Nursery Management	
	ACSC 2502: Farm Technology I	AGEC 2411: Mathematics & Basic Statistics	
6	AIES 2611: Forest Resource Utilization and Harvesting Techniques	ACSC 2502 Farm Technology I	
	AIES 2602: Introduction to Natural Resource Economics	AGEC 2402: Basic Economics	
	AIES 2612: Integrated Natural Resource Management and Planning		AIES 2631: Community Based Natural Resource Management
	AIES 2622: Natural Resource Policies & Administration		AIES 2631: Community Based Natural Resource Management
	ACSC 2601: Water Management & Soil Conservation	ACSC 2502: Farm Technology I	
	ACSC 2602: Crop Production	ACSC 2412: Principles of Crop Production	
	AACA 2610: Special Study	AGEC 2502: Introduction to Social Research Methods	
	AGEC 2601: Extension Methods	AGEC 2521: Introduction to Rural Sociology	
	AGEC 2602: Project Management	AGEC 2501: Financial Management	

C.5 MODULE DESCRIPTORS

C.5.1 FIRST YEAR MODULES

C.5.1.1 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.

C.5.1.2 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

C.5.1.3 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

C.5.1.4 AIES 2402: NURSERY MANAGEMENT

Module Title: **NURSERY MANAGEMENT**
Code: AIES 2402
NQF level: 4
Contact hours: Lectures: 2 hours/week for 14 weeks. Practical: 3 hours/week alternating for 14 weeks
Credits: 8
Module Assessment: Continuous assessment 60% (minimum 2 tests, 2 assignments, 10 practical excises/reports). Examination 40% (01 x 03 hour paper).
Pre-requisites: None
Module description (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.

C.5.1.5 AIES 2422: PLANT TAXOMONY

Module name: **PLANT TAXONOMY**
Subject code: AIES 2422
NQF level: 4
Contact hours: Lectures: 2 hour/week for 14 weeks. Practical: 3 hours/week alternating for 14 weeks
Credits 8
Module assessment : Continuous assessments 60% (tests, practical assessments) Examination 40% (1 x 3 hour paper)
Pre-requisite None
Module description (Content):
Introduction to plant taxonomy. taxonomic concepts, plant classification, nomenclature. Tree, shrubs and herb identification. Botanical keys: types and use. Specimen collection. Major plant families in Namibia: Fabaceae (3 sub-families), Euphorbiaceae, Rubiaceae, Combretaceae.

C.5.1.6 AIES 2442: GENERAL ECOLOGY

Module name: **GENERAL ECOLOGY**
Subject code: AIES 2442
NQF level : 4
Contact hours: Lectures: 2 hours/week for 14 weeks, Practical: 3 hours/week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessments 60% (2 tests, 3 practical reports/exercises, 1 assignment); Examination 40% (1x3 hour paper)
Module description (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.

C.5.1.7 AACA 2400: FARM DUTIES I

Module title: **FARM DUTIES**
Subject code: AACA 2400
NQF Level: 4
Contact hours: Practical: 7 hours (one full day) on alternating weeks for 28 weeks. Total: 98 hours
Credits: 16
Module Assessment: Assessment will be based on attendance at duty stations.
Prerequisite: None
Module Description (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 Neudamm and 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 (5 credits at level 5) 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).

C.5.2 SECOND YEAR MODULES

C.5.2.1 AIES 2511: PLANT ENTOMOLOGY AND PATHOLOGY

Module name: **PLANT ENTOMOLOGY AND PATHOLOGY**
Subject code: AIES 2511
NQF level: 5
Contact hours : Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week for 14 weeks
Credits: 16
Module assessment: Continuous assessments 60% (Minimum 2 tests, 3 practical exercises/reports, and 1 assignment); Examination 40% (1 x 3 hour paper)

Pre-requisite: None

Module description (Content):

Introduction to Entomology, General insect biology, Insect classification, Insects as pests, Beneficial insects, Insects in Namibian Forests, Insect population dynamics, Preventive and control measures. Integrated pest management Introduction to plant Pathology, Non-infectious agents and diseases, Infectious agents and diseases, Diseases caused by fungi, Beneficial fungi and Disease prevention and control.

C.5.2.2 AIES 2531: INTRODUCTION TO AGROFORESTRY

Module title: **INTRODUCTION TO AGROFORESTRY**
Code: AIES 2531 :
NQF level: 5
Contact hours: Lectures: 4 hours/week for 14 weeks Practical: 3 hours/week for 14 weeks
Credits: 16
Module assessment: Continuous assessments 60% (2 tests, 4 practical reports, and 2 assignments. Examination 40% (1 x 3 hours paper)
Pre-requisite: ACSC 2412: Principles of Crop Production

Module description (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. Research in agroforestry. Agroforestry project work.

C.5.2.3 AIES 2501: VEGETABLE ASSESSMENT AND MONITORING TECHNIQUES

Module name: **VEGETATION ASSESSMENT AND MONITORING TECHNIQUES**
Subject code: AIES 2501
NQF level: 5
Contact hours: Lectures: 2 hour/week for 14 weeks; Practical: 23 hours /week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessments 60% (minimum 2 tests, 3 practical exercises, 1 inventory report); Examination 40% (1 x 3 hour paper)
Prerequisite: AIES 2442: General Ecology

Module description (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.

C.5.2.4 AIES 2521: WILDLIFE SURVEY TECHNIQUES AND MONITORING

Module name: **WILDLIFE SURVEY TECHNIQUES AND MONITORING**
Subject code: AIES 2521
NQF level: 5
Contact hours: Lectures: 2 hours/week for 14 weeks; Practical: 3 hours/week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessments 60% (2 test, 3 practical exercise, 1 assignment) Examination 40% (1 x 3 hour paper)
Pre-requisite None

Module description (Content):

General principles and purpose of surveys and sampling. Sampling techniques: quadrats, transects, strip transects, point counts, aerial surveys, waterhole counts and spoor counts, mark-recapture techniques, Monitoring: design monitoring schemes, timing and frequency of monitoring.

C.5.2.5 AIES 2512: FOREST AND VELD FIRE MANAGEMENT

Module Title: **FOREST AND VELD FIRE MANAGEMENT**
Code: AIES 2512
NQF level: 5
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment 60% (minimum 2 tests, 2 assignments, 3 practical reports/exercises, 1 excursion report, 1 fire management plan). Examination 40% (1x 3 hours paper)
Pre-requisites: AIES 2442: General Ecology

Module description (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.

C.5.2.6 AIES 2532: SILVICULTURE

Module Title: **SILVICULTURE**
Code: AIES 2532
NQF level: 5
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week for 14 weeks
Credits: 16

Module Assessment: Continuous assessment 60% (minimum 2 tests, 2 assignments, 3 practical reports/exercises, 1 excursion report). Examination 40% (1 x 3 hours paper)
Pre-requisites: AIES 2402: Nursery Management
Module description (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. Silvicultural systems: high forest systems, coppice systems and agroforestry systems. Factors affecting the selection of a silvicultural system. Introduction to tree breeding: definitions and concepts, species trial selection, provenance trial (with specific reference to the performance of trials in Namibia)

C.5.2.7 AACA 2500: FARM DUTIES II

Module title: **FARM DUTIES**
Subject code: AACA 2400
NQF Level: 4
Contact hours: Practical: 7 hours (one full day) on alternating weeks for 28 weeks. Total: 98 hours
Credits: 16
Module Assessment: Assessment will be based on attendance at duty stations.
Prerequisite: None
Module Description (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 Neudamm and 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 (5 credits at level 5) 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).

C.5.3 THIRD YEAR MODULES

C.5.3.1 AIES 2611: FOREST RESOURCE UTILIZATION AND HARVESTING TECHNIQUES

Module Title: **FOREST RESOURCE UTILISATION & HARVESTING TECHNIQUES**
Code: AIES 2611
NQF level: 6
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment 60% (minimum 2 tests, 2 assignments, 3 practical reports/exercises, 1 excursion report). Examination 40% (1 x 3 hours paper)
Pre-requisites: ACSC 2502: Farm Technology I
Module description (content):
Ergonomics and work safety. Uses and maintenance of forestry tools and machinery: edged tools, handsaws, other tools and accessories, chain saw, farm tractors and hi-tech machinery. Harvesting and transportation techniques of various timber and non-timber products: objectives, methods and systems: Harvesting and transport costs. Forest roads, their design and maintenance. Factors affecting harvesting and transportation systems (economic, social, political and environmental). Wood processing and utilization in Namibia and in the world: charcoal production, sawmilling, wood based materials (veneer, particle boards, fibre boards, hard boards, pulps and papers, wood carving and traditional implements). Wood preservation: principles and methods of preserving wood. Wood seasoning: principles and methods of drying and seasoning wood. . The use of market demand for sustainable utilization of forest products with relevance to Namibia wood industry e.g. charcoal. Wood carving, beekeeping, medicinal plants, etc

C.5.3.2 AIES 2631: COMMUNITY BASED NATURAL RESOURCE MANAGEMENT

Module Title: **COMMUNITY BASED NATURAL RESOURCE MANAGEMENT (CBNRM)**
Code: AIES 2631
NQF level: 6
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: 3 hours/week for 14 weeks
Credits: 16
Module assessment: Continuous Assessments 60% (Minimum 2 tests, 2 assignment, 1 field trip report). Examination 40% (1x3 hours paper)
Prerequisite: None
Module description (Content):
Rural development concepts and principles; Rural livelihood strategies; Introduction to community based management of natural resources; History of community involvement in conservation in Southern Africa; Formation of conservancies and community forestry initiatives, processes and procedures for formations; Policy and strategy frames relevant to community forestry and conservancies; Conflict resolution mechanisms.

C.5.3.3 AIES 2601: PRINCIPLES OF BEEKEEPING

Module name: **PRINCIPLES OF BEE KEEPING**
Subject code: AIES 2601
NQF level: 6
Contact hours: Lectures: 2 hour/week for 14 weeks; Practical: 3 hours/week alternating for 14 weeks
Credits 8
Module assessment : Continuous assessments 60% (2 tests, 3 practical reports); Examination 40% (1x3 hour paper)
Prerequisite: None
Module description (Content):
The history and importance of bee keeping. Biology of honey bee including races and social behaviour. Honeybee types. Honey bee colony, life history,

and anatomy. Honey bee nutrition and production of nectar and pollen. Bee forage and harvesting. Beekeeping equipment and starting up. The beehive, types and their management for honey production. Honey products, production, and processing including their handling, grading quality control, record keeping and marketing of products. Summer and winter management of productive colonies. Crop pollination and damage to bee colonies by poisoning. Diseases and pests of honeybees. Bee diseases and parasites and their control.

C.5.3.4 AACA 2601: FIELD ATTACHMENT

Module title: **FIELD ATTACHMENT**
Subject code: AACA 2601
NQF Level: 6
Contact hours: Lecture: 21 hours per three years. Practical: 6 weeks per three years
Credits: 8
Module Assessment: Continuous assessment during site inspection. Assessment of field report and assessment of oral presentation.
Module Description (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 will consist of on-site inspection, a report by the field supervisor and a written report and oral presentation by the student.

C.5.3.5 AACA 2600: SPECIAL STUDY

Module title: **SPECIAL STUDY**
Subject code: AACA 2600
NQF Level: 6
Contact hours: Lecture: 2 hours per week for 28 weeks. Practical: 3 hours per week for 28 weeks
Credits: 16
Module Assessment: Assessment will be based on written report (50%) and assessed by the supervisor and one other lecturer, an oral presentation (30% assessed by all lecturers) and Assignments.
Module Description (Content):
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.

C.5.3.6 AIES 2602: INTRODUCTION TO NATURAL RESOURCE ECONOMICS

Module name: **INTRODUCTION TO NATURAL RESOURCE ECONOMICS**
Subject code: AIES 2602
NQF level: 6
Contact hours: Lectures: 2 hour/week for 14 weeks; Practical: 3 hours/week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessments 60% (minimum 2 tests, 3 practical reports and 1 term assignment) Examination 40% (1x2 hour examination paper)
Pre-requisite : AGEC 2402: Basic Economics
Module description (Content):
Review of economic principles: Costs of production, price formation, capital and interest, depreciation. Economic analysis: Investment analysis, productivity, economic efficiency. Value of the land and other natural resources; valuation techniques and surrogate markets; natural resources contribution to the national economy.

C.5.3.7 AIES 2612: INTEGRATED NATURAL RESOURCE MANAGEMENT AND PLANNING

Module Title: **INTEGRATED NATURAL RESOURCE MANAGEMENT AND PLANNING**
Code: AIES 2612
NQF level: 6
Contact hours: Lectures: 4 hours/week for 14 weeks; Practical: hours/week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment 60% (minimum 2 tests, 2 assignments, 1 excursion report, 1 integrated management plan). Examination 40% (1 x 3 hours paper)
Co-requisites: AIES 2631: Community Based Natural Resource Management
Module description (Content):
Introduction: definition and approaches, natural resources and data, objective formulation of natural resource management plan, models and approaches used. Planning concepts and methods in forest management: sustainability, growth and yield of renewable resources, operational planning. Components of integrated natural resource management and their interactions (land, water, forests, water, non-wood products and services, others). Integrated natural resource management processes. Methodologies for integrated natural resource management plan formulation. Integrated resource management plan for water, rangelands and forests. Evaluation and monitoring methods for integrated resource management plan.

C.5.3.8 AIES 2622: NATURAL RESOURCE POLICIES AND ADMINISTRATION

Module name: **NATURAL RESOURCE POLICIES AND ADMINISTRATION**
Subject code: AIES 2622
NQF level: 6
Contact hours: Lectures: 2 hours/week for 14 weeks; Practical: 3 hours/week alternating for 14 weeks
Credits: 8
Module assessment: Continuous assessments 60% (2 tests,2 practical reports, 2 assignments); Examination 40% (1 x 3 hour paper)
Co-requisite: AIES 2631: Community Based Natural Resource Management

Module description (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.

D. B.SC. (HONS) AGRICULTURE (AGRICULTURAL ECONOMICS)

D.1 FIRST YEAR

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.

COURSE	CODE	COURSE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	42	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	42	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3532	Chemistry for Life Sciences	5	04/56	42	16
SPHY	3412	Physics for Life Science II	4	04/56	42	16
SBLG	3512	Diversity of Life	5	04/56	42	16
SMAT	3512	Precalculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS						**88**
TOTAL FIRST YEAR CREDITS						**160**

D.2 SECOND YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	3681	Principles of Microeconomics	6	03/42	0	12
AGEC	3691	Rural Sociology	6	03/42	0	12
AASC	3601	Genetics	6	02/28	21	8
ACSC	3681	Plant Science	6	03/42	28	12
AFST	3601	Human Nutrition	6	02/28	14	8
AFST	3621	General Microbiology	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**60**
Semester 2						
AAEN	3602	Agricultural Engineering	5	02/28	21	8
AGEC	3682	Production Economics	6	03/42	0	12
AGEC	3692	Principles of Macroeconomics	6	03/42	0	12
AASC	3612	Biochemistry	6	04/56	21	16
AASC	3602	Livestock Production Systems	6	02/28	21	8
ACSC	3682	Agronomy	6	03/42	42	12
AFST	3602	Food Technology	6	02/28	21	8
TOTAL SEMESTER 2 CREDITS						**76**
TOTAL SECOND YEAR CREDITS						**136**

D.3 THIRD YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS	PREREQUISITE
Semester 1							
AGEC	3711	Mathematical Econ & Linear Prog	7	04/56	14	16	
AGEC	3781	Farm Planning and Management	7	03/42	21	12	
AGEC	3791	Research Methods in Agric Economics	7	03/42	14	12	
AACA	3708	Field Attachment I	7	0	0	6	
AGER	3781	Resource Economics	7	03/42	14	12	
ACSC	3791	Field Crop Production	7	03/42	21	12	
TOTAL SEMESTER 1 CREDITS						**70**	
Semester 2							
AGEC	3782	Agricultural Marketing	7	03/42	14	12	
AGEC	3792	Econometrics for Agric Economists	7	03/42	28	12	
AGEC	3712	Agricultural Extension	7	04/56	21	16	
AGEF	3782	Agricultural Finance and Credit	7	03/42	14	12	
AASC	3742	Game Ranching	7	02/28	21	8	
AAEN	3722	Farm Mechanization	7	02/28	21	8	
TOTAL SEMESTER 2 CREDITS						**68**	
TOTAL THIRD YEAR CREDITS						**138**	

D.4 FOURTH YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS	PREREQUISITE
Semester 1							
AGEC	3810	Research Project in Agric Econ	8	04/56	42	16	
AACA	3808	Field Attachment II	8	0	0	6	
AGEC	3881	Project Planning and Management	8	03/42	21	12	
AGEC	3801	Rural Development	8	02/28	14	8	
AGEC	3891	International Agric Trade & Policy	8	03/42	21	12	
AASC	3891	Beef Production	8	03/42	28	12	
ACSC	3881	Horticulture I	8	03/42	21	8	
TOTAL SEMESTER 1 CREDITS						**74**	
Semester 2							
AGEC	3810	Research Project in Agric Econ	8	04/56	42	16	
AGEC	3882	Agricultural Policy Analysis	8	03/42	28	12	
AGEC	3892	Entrepreneurship & Agric Bus Mgt	8	03/42	21	12	
AGEC	3802	Development Economics	8	02/28	14	8	
AASC	3892	Small Ruminant Production	8	03/42	21	12	
TOTAL SEMESTER 2 CREDITS						**60**	
TOTAL FOURTH YEAR CREDITS						**134**	

AGRICULTURAL ECONOMICS DEPARTMENT: MODULE PRE- & CO-REQUISITES

YEAR	MODULE	PRE-REQUISITE	CO-REQUISITE
1	ULEA 3419: English for Academic Purposes	ULCE: English Comm & Study Skills	
2	AEC 3682: Production Economics		AEC 3681: Prin Microeconomics
3	AEC 3711: Mathematical Econ & Linear Programming	SMAT 3511: Basic Mathematics; SMAT 3512L Pre-calculus	
	AEC 3781: Farm Planning & Mgt	AEC 3682: Production Economics	
	AER 3781: Resource Economics	AEC 3681: Prin Microeconomics; AEC 3682: Production Economics	
	AEC 3782: Agric Marketing	AEC 3682: Production Economics	
	AEC 3792: Econometrics for Agric Economics	STS 3522: Introduction to Statistics	
	AEC 3712: Agric Extension	AEC 3691: Rural Sociology	
	AEF 3782: Agric Finance & Credit		AEC 3781: Farm Planning & Mgt
4	AEC 3810: Research Project in Agric Economics	AEC 3791: Research Methods in Agric Economics	
	AEC 3881: Project Planning & Mgt	AEC 3681: Prin Microeconomics	
	AEC 3801: Rural Development	AEC 3691: Rural Soc; AEC 3712: Agric Extension	
	AEC 3891: Int'l Agric Trade & Policy	AEC 3782: Agric Marketing	
	AEC 3882: Agric Policy & Analysis	AEC3782: Agric Marketing; AEC 3682: Production Economics	
	AEC 3892: Entrepreneurship & Agric Business Management	AEC 3782: Agric Marketing	AEC 3881: Project Planning & Mgt
	AEC 3802: Development Economics	AEC 3692: Prin Macroeconomics	AEC 3801: Rural Development

1ST AND 2ND YEAR MODULE EQUIVALENTS

YEAR	OLD MODULES	NEW MODULES
1	BLG 3101: Biology 1A	SBLG 3411: Introduction to Biology
	BLG 3112L Biology 1B	SBLG 3512: Diversity of Life
	PHC 3101: Physics 1A	SPHY: 3401: Physics for Life Science I
	PHC 3112: Physics 1B	SPHY 3412: Physics for Life Science II
	MTS 3101: Mathematics 1A	SMAT 3511: Basic Mathematics
	MTS 3112: Mathematics 1B	SMAT 3512: Pre-calculus
	STS 3101: Statistics 1A	SSTS 3522: Introduction to Statistics
	PHC 3192: Lab 1	Phased out
2	AEN 3202: Introduction to Agricultural Engineering	AEN 3602: Agricultural Engineering
	CSC 3231: Introduction to Plant Science	CSC 3681: Plant Science
	CSC 3212: Introduction to Agronomy	CSC 3682: Agronomy
	CSC 3271: Biometrics	CSC 3781: Research Methods I; CSC 3782: Research Methods II
	FSC 3201: Food and Human Nutrition	FST 3601: Human Nutrition
	FSC 3202: Introduction to Food	FST 3602: Food Technology

	Technology	

AGRICULTURAL ECONOMICS DEPARTMENT: MODULE EQUIVALENTS

YEAR	OLD MODULES	NEW MODULES
3	AEC 3311: Mathematics for Agric Economists	AEC 3711: Mathematical Economics and Linear Programming
4	AEC 3410: Research Project	AEC 3810: Research Project in Agric Economics

D.5 MODULE DESCRIPTORS: Basic Science & University Core Modules

D.5.1 FIRST YEAR MODULES

D.5.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

D.5.1.2 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

D.5.1.3 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

D.5.1.4 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title: **ENGLISH FOR ACADEMIC PURPOSES**
Code: ULEA 3419
NQF level: 4
Contact hours: 4 periods per week
Credits: 16
Module assessment: Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites: ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC
Module description (Content): This course 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.

D.5.1.5 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title:	**INTRODUCTION TO BIOLOGY**
Code:	SBLG 3411
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 domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

D.5.1.6 SBLG 3512: DIVERSITY OF LIFE

Module title:	**DIVERSITY OF LIFE**
Code:	SBLG 3512
Course Equivalent:	NSSC (/HIGH GRADE) Biology
NQF level:	5
Contact hours:	4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits:	16
Module assessment:	Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSCC (Biology C or better)

Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.

Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field

D.5.1.7 SPHY 3401: PHYSICS FOR LIFE SCIENCES I

Module title:	**PHYSICS FOR LIFE SCIENCES I**
Code:	SPHY3401
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.

D.5.1.8 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title:	**PHYSICS FOR LIFE SCIENCES II**
Code:	SPHY 3412

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.

D.5.1.9 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, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

D.5.1.10 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.

D.5.1.11 SCHM 3412: CHEMISTRY FOR LIFE SCIENCES

Module Title: **CHEMISTRY FOR LIFE SCIENCES**
Code: SCHM3412
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.

D.5.1.12 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.

(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.)

D.6 MODULE DESCRIPTORS: AGRICULTURAL ECONOMICS

D.6.1 SECOND YEAR MODULES

D.6.1.1 AGEC 3681: PRINCIPLES OF MICROECONOMICS

Module Title: **PRINCIPLES OF MICROECONOMICS**
Code: AGEC 3681
NQA Level: 6
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Credits: 12
Module Assessment: Continuous assessment (40%); at least two assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: None
Module Description (Content):
In this module students will be exposed to basic concepts and principles in microeconomics, including scarcity and concepts of supply and demand, consumer theory, demand and supply, the theory of the firm under perfect competition, profits, monopoly and other market structures, externalities, and public goods. The course provides an essential foundation for higher level Agricultural economics courses such as Marketing, Production Economics, and Farm management etc.

D.6.1.2 AGEC 3691: RURAL SOCIOLOGY

Module Title: **RURAL SOCIOLOGY**
Code: AGEC 3691
NQA Level: 6
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Credits: 12
Module Assessment: Continuous assessment (40%); at least two assessments; Examination (60%): (1 x 3-hour-paper)
Prerequisites: None
Module Description (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 populations; social theory and the types of societies; Socialization issues including social roles; deviance, conformity, sanctions, culture and society; social institutions including family, religion, education and government, social interaction, groups and group dynamics; rural urban migration and its causes; gender differences and gender and power relations;

D.6.1.3 AGEC 3682: PRODUCTION ECONOMICS

Module Title: **PRODUCTION ECONOMICS**
Code: AGEC 3682
NQA Level: 6
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Credits: 12
Module Assessment: Continuous assessment (40%); at least two assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3681: Principles of Microeconomics
Module Description (Content):
The course builds on basic concepts and principles of microeconomics in particular the theory of the firm. It introduces students to uses of economic principles in the process of decision making for optimal resource allocation and profit maximization in agricultural production. In addition, students will also have an understanding of the decision making under uncertainty.

D.6.1.4 AGEC 3692: PRINCIPLES OF MACROECONOMICS

Module Title: **PRINCIPLES OF MACROECONOMICS**
Code: AGEC 3692
NQA Level: 6
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs)
Credits: 12
Module Assessment: Continuous assessment (40%); at least two assessments; Examination (60%): (1 x 3-hour paper)

Prerequisites: None

Module Description (Content):

The modules introduces the students to basics concepts in macroeconomics including choice and scarcity in a modern economy, 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.

D.6.2 THIRD YEAR MODULES

D.6.2.1 AGEC 3711: MATHEMATICAL ECONOMICS AND LINEAR PROGRAMMING

Module Title: **MATHEMATICAL ECONOMICS AND LINEAR PROGRAMMING**
Code: AGEC 3711
NQA Level: 7
Contact Hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 1hr Prac/wk for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: SSMAT 3511:Basic Mathematics, SSMAT 3512 Pre-calculus

Module Description (Content):

The module provides students with the basic knowledge of mathematical concepts and tools that are often used for proper understanding of agricultural economics. The module focuses on sets, matrix algebra, functions, differentiation, integration, simplex method and linear programming and their applications to decision making in agricultural economics and business.

D.6.2.2 AGEC 3781: FARM PLANNING AND MANAGEMENT

Module Title: **FARM PLANNING AND MANAGEMENT**
Code: AGEC 3781
NQA Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1.5hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: Production Economics AGEC 3682

Module Description (Content):

Students acquaint themselves with the essential functions of management (planning, implementation, control) and decision making process which are fundamental to owning, managing, advising, and/ or servicing farm firms and other businesses. It emphasizes whole farm firm business planning with emphasis on resources availability and budgeting. Trend analysis and projecting future farm business plans using budgeting and computerized tools. It exposes students to management of farm records; machinery; land; labour; applications of linear programming in farm planning; and agricultural risk management strategies. Examples will be used from communal and commercial farms in SADC region and supplemented by farm management field trips and case studies.

D.6.2.3 AGEC 3791: RESEARCH METHODS IN AGRICULTURAL ECONOMICS

Module Title: **RESEARCH METHODS IN AGRICULTURAL ECONOMICS**
Code: AGEC3791
NQA Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: None

Module Description (Content):

Students acquaint themselves with basics concepts of research methodology, including the types of research used by agricultural economists, research problem definition and formulation, literature review, hypothesis formulation, research design and sampling, research budgeting and funding, construction of data collection instruments, data collection, data processing, presentation and report writing.

D.6.2.4 AGER 3781: RESOURCE ECONOMICS

Module Title: **RESOURCE ECONOMICS**
Code: AGER 3781
NQA Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AEC3681 Principles of Microeconomics

Module Description (Content):

This module is aimed at increasing student's knowledge on the theory of natural resources and environmental economics. It will also address property rights (tragedy of the commons), externalities, methods of valuation of natural resources, government and market failures, and optimal use of natural resources and the institutional process within which natural resource and environmental policies are formulated. Finally it will enable students to apply theoretical concepts to the analysis of policy issues related to natural resources utilization (e.g. water, land, fisheries, wildlife, and forests).

D.6.2.5 AGEC 3782: AGRICULTURAL MARKETING

Module Title: **AGRICULTURAL MARKETING**
Code: AGEC3782
NQA Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1hr Prac alternate wk for 14 weeks

Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessment; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3681 Principles of Microeconomics
Module Description (Content):
The module presents key concepts and theory in agricultural marketing, including agricultural marketing functions; marketing systems e.g. commodity exchanges and futures markets; market structures, agricultural pricing; marketing of agricultural products and inputs, market research, market planning and analysis of consumer behavior in purchasing agricultural products; and estimation of demand and supply elasticities. Students are also exposed to marketing constraints of developing countries, importance of market efficiency for economic growth development.

D.6.2.6 AGEC 3792: ECONOMETRICS FOR AGRICULTURAL ECONOMISTS

Module Title: **ECONOMETRICS FOR AGRICULTURAL ECONOMISTS**
Code: AGEC 3792
NQA Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 2hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: SSTS 3522: Introduction to Statistics
Module Description (Content):
The module familiarizes students with econometrics using an applications oriented approach comprising of identification of economic problems, formulation of economic and econometric model and assumptions; identification of data consistent with the problem and econometric model, estimation of key parameters of the model using OLS regression techniques; hypotheses testing, and discussion of empirical findings and implications for the economic model. Appropriate computer based software (e.g. SPSS or Shazam) will be used during the practical part of the module to ensure that all students acquire computing capabilities in econometrics and statistical analysis to answer economic questions.

D.6.2.7 AGEC 3712: AGRICULTURAL EXTENSION

Module Title: **AGRICULTURAL EXTENSION**
Code: AGEC 3712
NQA Level: 7
Contact Hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 1hr Prac/wk for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3691 Rural Sociology.
Module Description (Content):
The course explores Extension concepts, principles and philosophies theories and origin of extension, including the role of agricultural extension in sustainable agricultural development; Agricultural extension as adult learning; Extension methods; Audio-visual media in extension; Extension teaching methods. Designing extension programmes; Agricultural extension approaches; Applying learning theory in extension; Science based and indigenous knowledge systems and participatory methodologies. It also investigates farming systems research and extension approach and its applicability to Namibia and SADC countries.

D.6.2.8 AGEF 3782: AGRICULTURAL FINANCE & CREDIT

Module Title: **AGRICULTURAL FINANCE & CREDIT**
Code: AGEF 3782
NQA Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3781 Farm Planning and Management
Module Description (Content):
The module focuses on the application of principles and tools of finance to managerial problems in agribusiness and farming. The focus is on evaluating and controlling profitability, growth, risk and liquidity in the farm and agribusiness firms. Key concepts covered in the module include, farm accounting records, credit, leverage, capital budgets, and capital costs. These concepts are applied using financial analysis and developed in the context of agriculture. The course also examines land acquisition and improvements, and how and from whom farmers and agribusiness obtain loans.

D.6.2.9 AACA 3708: FIELD ATTACHMENT I

Module Title: **FIELD ATTACHMENT I**
Code: AACA 3708
NQF Level: 7
Contact Hours: 6 weeks
Credits: 6
Prerequisite: None
Module Assessment: Final assessment 100%: (Attachment report and Oral presentation).
Module Description (Content):
The module is designed to expose students to practical experience of actual operations on farms, agro-industries, and research institutions in Namibia. They are expected to observe many different aspects of operations, and participate in physical work and management of operations.

D.6.3 FOURTH YEAR MODULES

D.6.3.1 AGEC 3810: RESEARCH METHODS IN AGRICULTURAL ECONOMICS

Module Title: **RESEARCH PROJECT IN AGRICULTURAL ECONOMICS**
Code: AGEC 3810
NQA Level: 8

Contact Hours: Equivalent to 1 hour per week for 28 weeks
Credits: 32
Module Assessment: The assessment will consist of a research proposal write up and presentation of the research proposal in seminar, presentation of empirical findings in a second seminar, and grading of the final report.
Prerequisites: AGEC 3791 Research Methods in Agricultural Economics.
Module Description (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 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 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.

D.6.3.2 AGEC 3881: PROJECT PLANNING AND MANAGEMENT

Module Title: **PROJECT PLANNING AND MANAGEMENT**
Code: AGEC 3881
NQA Level: 8
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1.5hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3681 Principles of Microeconomics
Module Description (content):
Students are exposed to principles and applications in project planning and management. The module focuses on 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

D.6.3.3 AGEC 3801: RURAL DEVELOPMENT

Module Title: **RURAL DEVELOPMENT**
Code: AGEC 3801
NQA Level: 8
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 1hr Prac alternate wk for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3691 Rural Sociology and AGEC 3712 Agricultural Extension
Module Description (content):
The module investigates the context and interplay of forces in rural development and poverty, and focuses on the factors affecting rural agriculture, the rural-urban divide in terms of investment, services, infrastructure, jobs, recreation, opportunities for individual development and self-fulfillment, etc. Among the key issues investigated are 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.

D.6.3.4 AGEC 3891: INTERNATIONAL AGRICULTURAL TRADE & POLICY

Module Title: **INTERNATIONAL AGRICULTURAL TRADE & POLICY**
Code: AGEC 3891
NQA Level: 8
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1.5hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3782 Agricultural Marketing
Module Description (content)
The modules exposes the students to concepts and theories of international agricultural trade and policy, the various trade policies used by exporting countries and importing countries, the 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.

D.6.3.5 AGEC 3882: AGRICULTURAL POLICY ANALYSIS

Module Title: **AGRICULTURAL POLICY ANALYSIS**
Code: AGEC 3882
NQA Level: 8
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 2hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3682 Production Economics and AGEC 3782 Agricultural Marketing
Module Description (content):
This module exposes students to welfare analysis of agricultural policies, with emphasis on policy issues relevant to Namibia, such as land tenure, credit, trade etc. It also considers reasons for intervention and the welfare impacts on farmers, consumers, agricultural businesses (traders, transporters and processors) and the tax payer. Issues of food security, food quality and food safety and policies affecting the environment are also addressed. Some examples of applications of economic methods including policy analysis matrix (PAM) to agricultural interventions are given.

D.6.3.6 AGEC 3892: ENTREPRENEURSHIP & AGRIC BUSINESS MANAGEMENT

Module Title **ENTREPRENEURSHIP & AGRIC BUSINESS MANAGEMENT**
Code: AGEC 3892

NQA Level: 8
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 1.5hr Prac alternate wk for 14 weeks
Credits: 12
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisite: AGEC 3782 Agricultural Marketing
Co-requisite: AGEC 3881 Project Planning and Management.
Module Description (content)
The module investigates the important subject of entrepreneurship and agribusiness management, and the forces and ideas that lead to business establishment, growth, and survival, but also to choice of the option of self-employment. The module focuses on the entrepreneurial process, the different schools of thought on the sources of entrepreneurship, the entrepreneurs' characteristics, traits and motivation; 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) with examples from agribusiness or agri-food complex in Southern Africa.

D.6.3.7 AGEC 3802: DEVELOPMENT ECONOMICS

Module Title: **DEVELOPMENT ECONOMICS**
Code: 3802
NQA Level: 8
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 1hr Prac alternate wk for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (40%); at least three assessments; Examination (60%): (1 x 3-hour paper)
Prerequisites: AGEC 3692 Principles of Macroeconomics
Co-Requisite: AGEC 3801 Rural Development.
Module Description (content):
This course focuses on the central problems of development economics. In this course we shall try to understand; (with the aid of development theories) the nature of the process; which has transformed the developed countries in the past and why it has not occurred in the developing countries and what may be done to promote it in the future.

D.6.3.8 AACA 3808: FIELD ATTACHMENT

Module Title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF Level: 8
Contact Hours: 6 weeks
Credits: 6
Prerequisite: AACA 3708: Field Attachment I
Module Assessment: Final assessment 100%. (Attachment report and Oral presentation).
Module Description:
This module is designed to 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.

E. B.SC. (HONS) AGRICULTURE (ANIMAL SCIENCE)

E.1 FIRST YEAR

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.

COURSE	CODE	COURSE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	42	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	42	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3532	Chemistry for Life Sciences	4	04/56	42	16
SPHY	3412	Physics for Life Science II	4	04/56	42	16
SBLG	3512	Diversity of Life	5	04/56	42	16
SMAT	3512	Pre-calculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS						**88**
TOTAL FIRST YEAR CREDITS						**160**

E.2 SECOND YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	3681	Principles of Microeconomics	6	03/42	0	12
AGEC	3691	Rural Sociology	6	03/42	0	12
AASC	3601	Genetics	6	02/28	21	8
ACSC	3681	Plant Science	6	03/42	28	12
AFST	3601	Human Nutrition	6	02/28	14	8
AFST	3621	General Microbiology	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**60**
Semester 2						
AAEN	3602	Agricultural Engineering	6	02/28	21	8
AGEC	3682	Production Economics	6	03/42	0	12
AGEC	3692	Principles of Macroeconomics	6	03/42	0	12
AASC	3612	Biochemistry	6	03/42	21	16
AASC	3602	Livestock Production Systems	6	02/28	21	8
ACSC	3682	Agronomy	6	03/42	42	12
AFST	3602	Food Technology	6	02/28	21	8
TOTAL SEMESTER 2 CREDITS						**76**
TOTAL SECOND YEAR CREDITS						**136**

E.3 THIRD YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AASC	3701	Animal Nutrition	7	03/42	21	8
AASC	3721	Parasitology	7	02/28	21	8
AASC	3711	Animal Anatomy and Physiology	7	04/56	21	16
AACA	3708	Field Attachment I	7	0	0	6
AASC	3781	Animal Breeding	7	03/42	21	12
AGEC	3781	Farm Planning and Management	7	03/42	21	12
ACSC	3781	Research Methods I	7	03/ 42	21	12
TOTAL SEMESTER 1 CREDITS						**74**
Semester 2						
AASC	3782	Feeds and Feeding	7	03/42	21	12
AASC	3702	Animal Health	7	02/28	21	8
AASC	3722	Pig and Rabbit Production	7	03/28	21	8
AASC	3742	Game Ranching	7	02/28	21	8
AGEC	3712	Agricultural Extension	7	04/56	21	16
AGEC	3782	Agricultural Marketing	7	03/42	14	12
ACSC	3782	Research Methods II	7	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**76**
TOTALS THIRD YEAR CREDITS						**150**

E.4 FOURTH YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AASC	3810	Research Project	8	04/56	42	16
AASC	3811	Range and Pasture Management	8	04/56	21	16
AASC	3881	Beef Production	8	03/42	21	12
AASC	3801	Poultry and Ostrich Production	8	03/42	21	8
AACA	3808	Field Attachment II	8	0	0	6
AGEC	3881	Project Planning and Management	8	03/42	21	12
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
AASC	3810	Research Project	8	04/56	42	16
AASC	3882	Small Ruminant Production	8	03/42	21	12
AASC	3802	Dairy Production	8	02/28	21	8
AASC	3892	Meat Science and Livestock Products	8	03/42	21	12
AGEC	3892	Entrepreneurship & Agric Bus Mgt	8	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**60**
TOTALS FOURTH YEAR CREDITS						128

ANIMAL SCIENCE DEPARTMENT: MODULE PRE- & CO-REQUISITES

YEAR	MODULE	PRE-REQUISITE	CO-REQUISITE
3	ASC 3781: Animal Breeding	ASC 3601: Genetics	
	ASC 3782: Feeds and Feeding		ASC 3701: Animal Nutrition
	ASC 3702: Animal Health		ASC 3721: Parasitology

E.5 MODULE DESCRIPTORS: Basic Science & University Core Modules

E.5.1 FIRST YEAR MODULES

E.5.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

E.5.1.2 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

E.5.1.3 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a

new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

E.5.1.4 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title: **ENGLISH FOR ACADEMIC PURPOSES**
Code: ULEA 3419
NQF level: 4
Contact hours: 4 periods per week
Credits: 16
Module assessment: Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites: ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC
Module description (Content): This course 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.

E.5.1.5 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title: **INTRODUCTION TO BIOLOGY**
Code: SBLG 3411
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 domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

E.5.1.6 SBLG 3512: DIVERSITY OF LIFE

Module title: **DIVERSITY OF LIFE**
Code: SBLG 3512
Course Equivalent: NSSC (/HIGH GRADE) Biology
NQF level: 5
Contact hours: 4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits: 16
Module assessment: Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites: NSCC (Biology C or better)
Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.
Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field

E.5.1.7 SPHY 3401: PHYSICS FOR LIFE SCIENCES I

Module title: **PHYSICS FOR LIFE SCIENCES I**
Code: SPHY3401
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.

E.5.1.8 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title: **PHYSICS FOR LIFE SCIENCES II**
Code: SPHY 3412
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.

E.5.1.9 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, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

E.5.1.10 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.

E.5.1.11 SCHM 3412: CHEMISTRY FOR LIFE SCIENCES

Module Title: **CHEMISTRY FOR LIFE SCIENCES**
Code: SCHM3412
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.

E.5.1.12 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.

(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.)

E.6 MODULE DESCRIPTORS: ANIMAL SCIENCE

E.6.1 SECOND YEAR MODULES

E.6.1.1 AASC 3601: GENETICS

Module title:	**GENETICS**
Code:	AASC 3601
NQF level:	06
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous assessment 40% (at least 2x tests; 1x assignment); Examination 60% (1 x 2hour paper)
Prerequisites:	None

Module description (content): This module covers the transmission of the genetic material: mitosis and meiosis and their genetic significance are discussed; Mendelian genetics, extension of Mendelian Analysis (e.g. multiple alleles, gene interactions, lethal alleles, modified Mendelian ratios). The module examines linkage, applications of linkage in livestock, chromosome variation, sex determination and chromosome mutations. The content also covers the structure of DNA, presents the classical experiments that revealed DNA and RNA to be the genetic material and that established the double helix model as the structure of DNA. The coverage also includes properties of DNA, the double helix model and replication in prokaryotes and eukaryotes. Subsequent material covered includes transcription, the genetic code and its properties, translation, point mutations, their types and causes.

E.6.1.2 AASC 3612: BIOCHEMISTRY

Module Title:	**BIOCHEMISTRY**
Code:	AASC 3612
Contact hours:	Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits:	16
Module assessment:	Continuous assessment 40% (2 tests and at least 2 laboratory reports or assignments).Examination 60% (1 x 3hour examination paper)
Prerequisites:	Introduction to Biology (SBLG3411)

Module description (Content): Introduction to Biochemistry; Functional groups, REDOX reaction; Water; Acids, Bases, Buffers and their functions in biological systems; Structure and function of macromolecules (carbohydrates, proteins and lipids); Enzymes as catalysts; Nomenclature of enzymes; Factors affecting enzyme activities; Centrifuge, chromatography , DNA and protein electrophoresis; Introduction to metabolism - Glycolysis, Alcohol and lactic acid fermentation, TCA cycle, Electron Transport Chain and Oxidative Phosphorylation; Endergonic and Exergonic reactions; ATP - The universal currency of free energy; Photosynthesis; Glyoxylate cycle (oily seeds); Overview of the synthesis of disaccharides (lactose and sucrose) and polysaccharides (starch and glycogen); Gluconeogenesis; Pentose Phosphate Pathway; Regulation of carbohydrate metabolism; Diseases associated with carbohydrate metabolism; Regulation of gene expression – The *Lac* operon; Enzyme Kinetics - Michaelis/Menten and Lineweaver-Burk plot; Vitamins and Coenzymes; Digestion and absorption of macromolecules (carbohydrates, proteins, lipids, nucleic acids) in animals; The Cori cycle; Enzyme inhibition and Allosterism; Introduction to Fat metabolism; Integration of carbohydrate and fat metabolism; Biochemical degradation of plant poisons and pesticides.

E.6.1.3 AASC 3602: LIVESTOCK PRODUCTION SYSTEMS

Module title: **LIVESTOCK PRODUCTION SYSTEMS**
Code: AASC 3602
NQF level: 06
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module assessment: Continuous assessment 40% (at least 3 assessments). Examination 60% (1 x 2hours paper)
Prerequisites: None
Module description (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.

E.6.2 THIRD YEAR MODULES

E.6.2.1 AASC 3701: ANIMAL NUTRITION

Module title: **ANIMAL NUTRITION**
Code: AASC 3701
NQF level: 07
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module assessment: Continuous Assessment: 40% (at least 3 assessments); Examination: 60% (1 x2 hour papers).
Prerequisite: None.
Module description/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, Gas Chromatograph, Spectrophotometer in animal nutrition; Use of feed value estimates and; Mineral and vitamin nutrition.

E.6.2.2 AASC 3721: PARASITOLOGY

Module Title: **PARASITOLOGY**
Code: AASC 3721
NQF level: 7
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous Assessment: 40% (at least 3 assessments); Examination: 60% (1x2 hour papers).
Pre-requisite: None.
Module Description/Content: Students are introduced to concepts pertaining to the 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 behavioural 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.

E.6.2.3 AASC 3711: ANIMAL ANATOMY AND PHYSIOLOGY

Module Title: **ANIMAL ANATOMY AND PHYSIOLOGY**
Code: AASC 3711
NQF level: 7
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous Assessment: 40% (at least 4 assessments): Examination 60% (1 x3 hours papers).
Pre-requisite: None
Module Description (Content): 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). 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.

E.6.2.4 AACA 3708: FIELD ATTACHMENT I

Module title: **FIELD ATTACHMENT I**
Code: AACA 3708
NQF Level: 7
Contac hours: Six weeks of field attachment
Credits: 6
Module assessment: 40% (Class oral presentation) 60% (report write up.)
Prerequisite: none

Module description (Content):
This module exposes students to different agricultural and/or agro-industry environments through attaching students to farms, research stations, agro-industries and governmental and non-governmental institutions involved in agriculture and rural development. Students gain insights and additional hands-on experience in day-to-day running of an agricultural enterprise and have the opportunity to complement their theoretical knowledge.

E.6.2.5 AASC 3781: ANIMAL BREEDING

Module title: **ANIMAL BREEDING**
Code: AASC 3781
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous Assessment: 40**% (**at least 4 assessments): Examination 60% (1 x3 hour papers).
Prerequisites: Genetics (AASC 3601)
Module description (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, partitioning of variation into its causes; estimation of heritability; 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. To keep abreast with the latest developments the course also introduces molecular genetics and its applications, specifically: types of genetic markers, gene mapping and QTL detection; marker-assisted selection, gene introgression; selection for disease resistance.

E.6.2.6 AASC 3782: FEEDS AND FEEDING

Module title: **FEEDS AND FEEDING**
Code AASC 3782
NQF level 7
Contact hours Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits 12
Module assessment: Continuous Assessment: 40% (at least 4 assessment); Examination 60% (1 x3 hour papers).
Co-requisite: Animal Nutrition (AASC 3701).
Module description (Content):
This module introduces students to basic feeds and feeding concepts and terminologies. 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.

E.6.2.7 AASC 3702: ANIMAL HEALTH

Module Title: **ANIMAL HEALTH**
Code: AASC 3702
NQF level: 7
Contact hours**:** Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous Assessment: 40% (at least 4 assessments); Examination 60% : 1 x2 hour papers).
Co- requisites: Parasitology (AASC 3721)
Module Description (Content):
This module acquaints students with the understanding of the concepts of animal health and disease, disease development and body response in livestock. At the end of the module, the students learn common diseases of cattle, sheep, goats, pigs, and poultry in Namibia. Practical classes allow the participation of students in actual activities pertaining to animal health as performed by veterinarian and technicians on the farm as well as manipulating laboratory techniques necessary for diagnosing diseases of domestic animals.

E.6.2.8 AASC 3722: PIG AND RABBIT PRODUCTION

Module title: **PIG AND RABBIT REPRODUCTION**
Code: AASC 3722
NQF level: 07
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module assessment: Continuous Assessment: 40% (at least 4 assessments) Examination: 60% (1 x3 hour papers).
Prerequisites: None.
Module description (Contents):
Students will be introduced to methods of pig farming in both intensive and extensive systems. It also exposes students to routine management practices performed in pig industries. Students will acquaint themselves to different techniques of breeding, animal behavior, pig reproduction and physiology. Business of pig products and processing will be discussed. General principles of feeding of pigs and rabbits will be fully covered.

E.6.2.9 AASC 3742: GAME RANCHING

Module Title: **GAME RANCHING**
Code: AASC 3742
NQF level: 07

Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module assessment: Continuous assessment: (40%) consisting of at least two tests, two assignments, seminars & practicals. Examination: 60% (1x3hour papers).
Prerequisite: None
Module description (Content): The module familiarizes students with Game Ranching issues in Namibia and develops the students' understanding, skills and attitude pertinent to Game Ranching taking into account topics including: Role of Game Ranching at the farm level & contribution to the national economy; Ethics & reasons for conserving & preserving game animals; Comparative productivity indices of selected game and domestic animals; 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.

E.6.3 FOURTH YEAR MODULES

E.6.3.1 AASC 3810: RESEARCH PROJECT

Module title: **RESEARCH PROJECT**
Code: AASC 3810
NQA Level: 8
Contac hours: Individual consultation
Credits: 32
Module assessment: Continuous assessment 40% (oral presentation) 60% Project write-up
Prerequisite: CSC 3781: Research Methods I; CSC 3782: Research Methods II
Module description: The course develops 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).

E.6.3.2 AASC 3811: RANGE AND PASTURE MANAGEMENT

Module title: **RANGE AND PASTURE MANAGEMENT**
Code: AASC 3811
NQF level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module assessment: Continuous Assessment: 40% (at least 4 assessments); Examination 60% (1 x3 hour papers).
Prerequisite: None
Module description/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, C_3 vs. C_4, 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.

E.6.3.3 AASC 3881: BEEF PRODUCTION

Module title: **BEEF PRODUCTION**
Code: AASC 3881
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous Assessment: 40% (at least 4 assessment); Examination 60% (1 x3 hour papers).
Prerequisite: None
Module description/content:
The module familiarizes students with the Namibian beef industry including its importance, challenges, structure and functionality. The module also 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 & equipments 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; Performance and progeny testing; Planning a beef cattle enterprise and; Livestock & livestock products traceability including FAN Meat Scheme.

E.6.3.4 AASC 3801: POULTRY AND OSTRICH PRODUCTION

Module title: **POULTRY AND OSTRICH PRODUCTION**
Code: AASC 3801
NQF level: 8
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credit: 8
Module assessment: Continuous Assessment: 40% (at least 4 assessments); Examination 60% (1 x3 hour papers).
Prerequisites: None
Module description (contents)
Student will acquaint themselves with theoretical and practical aspect of poultry and Ostrich Production especially on the issue of production system, ostrich and poultry farming, routine operations, reproduction including the physiology of eggs formation and embryo development; egg incubation and hatching. Methods of disease prevention and control, marketing and processing of poultry and ostrich products will be discussed. Formulation of proper diet for ostrich and poultry and their nutrition requirement of will be investigated.

E.6.3.5 AACA 3808: FILED ATTACHMENT II

Module title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF level: 8
Contact hours: Eight (8) Practical hours per day for 6 weeks.
Credits: 6
Module assessment: Report (60%) and an oral presentation (40%).
Prerequisite: AASC 3708
Module description:
This module consolidates classroom work while exposing students to different agricultural and/or agro-industry environments through attaching students to animal and/or agro-industries, livestock farms, game ranches, research stations and, other governmental and non-governmental institutions involved in agriculture and rural development.

E.6.3.6 AASC 3882: SMALL RUMINANT PRODUCTION

Module title: **SMALL RUMINANT PRODUCTION**
Code: AASC 3882
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
C**redit**s: 12
Module assessment: Continuous Assessment: 40% (at least 4 assessmenst); Examination 60% (1 x3 hour papers).
Prerequisites: None
Module description:
This module introduces student to the concept of small ruminant production and this include, grazing systems, feeding management and nutrition required by different classes of sheep and goats. Feeding habit of sheep and goats, current situation of goats and sheep including breeds found in Namibia will be discussed. They will also be introduced to different types of breeding techniques including the advantages and disadvantages. Student expected to conduct practical in castration, ear notching and recording of stock.

E.6.3.7 AASC 3802: DAIRY PRODUCTION

Module title: **DAIRY PRODUCTION**
Code: AASC 3802
NQF level: 8
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module assessment: Continuous Assessment: 40% (at least 4 assessment); Examination 60% (1 x3 hour papers).
Prerequisite: None
Module Description/Content:
The module familiarizes students with the Namibian dairy industry including its importance and challenges, arrangement and functionality and future prospects. The module also develops the students' understanding and skills in the following topics: Dairy cattle breeds and dairying systems; Requisite facilities and equipments at a dairy unit; Factors to consider when establishing a dairy herd; Breeding, selection and mating systems and methods in dairying; Calving and calf management including dystocia; Dairy herd replacement; Diseases & parasites and their control; Anatomy and physiology of the udder; Biosynthesis of milk, milk secretion & let-down; Milk production cycle and lactation curve; Cow calendar; Performance targets and records and milking frequencies; Managing lactating & dry cows including re-breeding, drying-off procedures, feeding & feeding systems and ration formulation; Metabolic disorders & diseases of dairy cattle; Milk handling, quality, hygiene and marketing of dairy produce; Dairy business development and management.

E.6.3.8 AASC 3892: MEAT SCIENCE AND LIVESTOCK PRODUCTS

Module Title: **MEAT SCIENCE AND LIVESTOCK PRODUCTS**
Code: AASC 3892
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous Assessment: 40% (at least 4 assessments); Examination 60% (1 x3 hour papers).
Pre-requisite: None
Module Description/Content:
This introduces students to muscle physiology and carcass composition. Emphasize the importance on handling meat, preservation, storage of livestock products as well as public health hazards. Abattoir hygiene, basic processing of meat and livestock products is discussed. Students are also introduced to

quality traits of eggs, milk, meat, wool, hides and skins. The module briefly introduces students to factors affecting quality, public health hazards, and bio-security and consumers concerns.

F. B.SC. (HONS) AGRICULTURE (CROP SCIENCE) ({Ogongo Campus})

F.1 FIRST YEAR

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.

COURSE	CODE	COURSE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	42	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	42	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3532	Chemistry for Life Sciences	5	04/56	42	16
SPHY	3412	Physics for Life Science II	4	04/56	42	16
SBLG	3512	Diversity of Life	5	04/56	42	16
SMAT	3512	Precalculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS						**88**
TOTAL FIRST YEAR CREDITS						**160**

F.2 SECOND YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	3681	Principles of Microeconomics	6	03/42	0	12
AGEC	3691	Rural Sociology	6	03/42	0	12
AASC	3601	Genetics	6	02/28	21	8
ACSC	3681	Plant Science	6	03/42	28	12
AFST	3601	Human Nutrition	6	02/28	14	8
AFST	3621	General Microbiology	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**60**
Semester 2						
AAEN	3602	Agricultural Engineering	6	02/28	21	8
AGEC	3682	Production Economics	6	03/42	0	12
AGEC	3692	Principles of Macroeconomics	6	03/42	0	12
AASC	3612	Biochemistry	6	04/56	21	16
AASC	3602	Livestock Production Systems	6	02/28	21	8
ACSC	3682	Agronomy	6	03/42	42	12
AFST	3602	Food Technology	6	02/28	21	8
TOTAL SEMESTER 2 CREDITS						**76**
TOTAL SECOND YEAR CREDITS				**136**		

F.3 THIRD YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
ACSC	3781	Research Methods I	7	03/42	21	12
ACSC	3791	Field Crop Production	7	03/42	21	12
ACSC	3701	Seed Science & Technology	7	02/28	21	8
ACSC	3721	Weed Science	7	02/28	21	8
AACA	3708	Field Attachment I	7	0	0	6
ACRS	3781	Plant Breeding	7	03/42	21	12
AGEC	3781	Farm Planning and Management	7	03/42	21	12
TOTAL SEMESTER 1 CREDITS						**70**
Semester 2						
ACSC	3782	Research Methods II	7	03/42	21	12
ACSC	3702	Crop Ecophysiology	7	02/28	21	8
AAEN	3702	Crop Storage & Handling	7	02/28	21	8
AAEN	3722	Farm Mechanization	7	02/28	21	8
AIES	3622	Climatology and Hydrology	6	02/28	21	8
AGEC	3712	Agricultural Extension	7	04/56	21	16
AGEC	3782	Agricultural Marketing	7	03/42	14	12
TOTAL SEMESTER 2 CREDITS						**72**
TOTAL THIRD YEAR CREDITS						**142**

F.4 FOURTH YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
ACSC	3810	Research Project	8	04/56	42	16
ACSC	3808	Field Attachment II	8	0	0	6
ACSC	3801	Horticulture I	8	02/28	21	8
ACSC	3821	Entomology	8	02/28	21	8
ACSC	3881	Soil Fertility and Plant Nutrition	8	03/42	21	12
AAEN	3881	Soil and Water Management	8	03/42	21	12
TOTAL SEMESTER 1 CREDITS						**62**
Semester 2						
ACSC	3810	Research Project	8	04/56	42	16
ACSC	3882	Horticulture II	8	03/42	21	12
ACSC	3802	Plant Pathology	8	02/28	21	8
ACSC	3822	Plant Biotechnology	8	02/28	21	8
AAEN	3802	Land Use Planning	8	02/28	21	8
AGEC	3892	Entrepreneurship & Agric Bus Mgt	8	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**64**
TOTALS FOURTH YEAR CREDITS						**126**

F.5 MODULE DESCRIPTORS: Basic Science & University Core Modules

F.5.1 FIRST YEAR MODULES

F.5.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

F.5.1.2 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

F.5.1.3 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

F.5.1.4 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title:	**ENGLISH FOR ACADEMIC PURPOSES**
Code:	ULEA 3419
NQF level:	4
Contact hours:	4 periods per week
Credits:	16
Module assessment:	Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites:	ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC

Module description (Content): This course 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.

F.5.1.5 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title:	**INTRODUCTION TO BIOLOGY**
Code:	SBLG 3411
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 domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

F.5.1.6 SBLG 3512: DIVERSITY OF LIFE

Module title:	**DIVERSITY OF LIFE**
Code:	SBLG 3512
Course Equivalent:	NSSC (/HIGH GRADE) Biology
NQF level:	5
Contact hours:	4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits:	16
Module assessment:	Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSCC (Biology C or better)

Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.

Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field

F.5.1.7 SPHY 3401: PHYSICS FOR LIFE SCIENCES I

Module title:	**PHYSICS FOR LIFE SCIENCES I**
Code:	SPHY3401
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.

F.5.1.8 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title:	**PHYSICS FOR LIFE SCIENCES II**
Code:	SPHY 3412
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.

F.5.1.9 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, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

F.5.1.10 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.

F.5.1.11 SCHM 3412: CHEMISTRY FOR LIFE SCIENCES

Module Title:	**CHEMISTRY FOR LIFE SCIENCES**
Code:	SCHM3412
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.

F.5.1.12 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.

(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.)

F.6 MODULE DESCRIPTORS: CROP SCIENCE

F.6.1 SECOND YEAR MODULES

F.6.1.1 ACSC 3681: PLANT SCIENCE

Module title:	**PLANT SCIENCE**
Code:	ACSC 3681
NQF level:	6
National professional standards competencies:	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 03 hours paper)
Prerequisites	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding agricultural botany and plant physiology aspects, namely: Agronomic and Horticultural Taxonomy: binomial system, use of taxonomic keys. Anatomy of economic crop species; cell types, tissues types. Morphology and anatomy of root, stem, leaves, flowers, fruits. Pollination: process, methods. Double fertilization. Agriculturally important plant families. Photosynthesis: chemistry, energy requirements. Respiration. Water: importance, uptake, transpiration. Translocation. Growth regulators.

F.6.1.2 ACSC 3682: AGRONOMY

Module title:	**AGRONOMY**
Code:	ACSC 3682
NQF level:	6
National professional standards competencies:	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous Assessment: 40 % (minimum of 2 tests, 1 assignment, 7 practicals). Examination: 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding the principles of agronomy and soil science, namely:
Land preparation: aims, timeliness. Seeding: factors affecting seed quality, seeding depth, seeding rate, effects of plant spacing. Harvesting: timeliness, harvest index. For each operation: procedures, labour requirements, costs and speed of operation. Cropping systems. Definition of soil. Soil formation. Soil profile, horizons, and influence of environmental factors. Sampling methods. Soil as a triphasic system: texture, structure, water holding capacity, etc. Soil colloids and soil reaction. Soil organic matter and soil organisms. Basics of soil fertility and Plant nutrition: required elements, functions, amounts required, deficiency and toxicity symptoms.

F.6.1.3 ACSC 3602: AGRICULTURAL ENGINEERING

Module title	**AGRICULTURAL ENGINEERING**
Code	AAEN 3602
NQF level	6
National professional Standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding basic agricultural engineering concepts, namely
Fundamentals of Engineering; Farm Power (Different sources of Power); Internal Combustion Engines. 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.

F.6.2 THIRD YEAR MODULES

F.6.2.1 ACSC 3791: FIELD CROP PRODUCTION

Module title:	**FIELD CROP PRODUCTION**
Code:	ACSC 3791
NQF level:	7
National professional standards competencies:	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding crop production issues, namely: Cereals (pearl millet, maize, wheat, sorghum, barley), oilseed (sunflower, caster bean), Legumes (cowpea, soybean, groundnuts, bambara nuts, Field beans), fiber crops (cotton), root and tuber crops (sweet potatoes, cassava, Irish potatoes) grown in Namibia: their importance to the economy, amount, uses, and production practices. Areas where grown, limitations to production. Potential crops (sisal).

F.6.2.2 ACSC 3721: WEED SCIENCE

Module title:	**WEED SCIENCE**
Code:	ACSC 3721
NQF level:	7
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding weed issue, namely:
History of weed science. Characteristics and effects of weeds. 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.

F.6.2.3 ACSC 3701: SEED SCIENCE AND TECHNLOGY

Module title:	**SEED SCIENCE AND TECHNOLOGY**
Code:	ACSC 3701
NQF level:	7
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding seed science and technology issues, namely: Importance of quality seed for crop production. Overview of Variety breeding: selection methods, variety evaluation and release. DUS-test. 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 dormancy, seed ecology and seed banks. Seed quality control: legislation, certification, inspection, testing. Marketing and distribution: demand forecasting, supply, pricing. End user utilization. Seed production of important crops of Namibia.

F.6.2.4 AACA 3708: FIELD ATTACHMENT I

Module Title:	**FIELD ATTACHMENT I**
Code:	AACA 3708
NQF Level:	7
Contact Hours:	6 Weeks
Credits:	6
Prerequisite:	None
Module Assessment:	Final assessment 100% (Attachment report and Oral presentation).

Module Description (Content):

The module is designed to expose students to practical experience of actual operations on farms, agro-industries, and research institutions in Namibia. They are expected to observe many different aspects of operations, and participate in physical work and management of operations.

F.6.2.5 ACSC 3781: PLANT BREEDING

Module title:	**PLANT BREEDING**
Code:	ACSC 3781
NQF level:	7
National professional standards competencies	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding plant breeding techniques and germplasm conservation issues, namely:

Aims of plant breeding. Selection theory. Pollination systems: inbreeding, out breeding, inbreeding depression, hybrid vigour, male sterility. Breeding procedure: conventional. Cultivars evaluation. Germplasm sources, wild ancestors and relatives. Process and effects of domestication. Germplasm collection and storage. Inbreeding and out breeding crops: unconventional: haploid plants, tissue culture, and gene transfer.

F.6.2.6 ACSC 3781: RESEARCH METHODS I

Module Title:	**RESEARCH METHODS I**
Code:	ACSC 3781
NQF level:	7
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module Assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites:	None

Module description (Content):

Types of research: basic research and applied research; Research process: research problem formulation, research objectives, hypothesis formulation, literature review, research methods and principles of experimental designs, sampling and sample size determinations, and replications. Workplans and budgets; Types of experimental designs: Analysis of Variance, standard experimental designs, factorial experiments, linear regression and correlation, transformations, non-parametric statistical techniques, mean comparisons. Procedures for implementing research project and presentation of research results. In addition, probability, Bayes' theorem, combinations and permutations, binomial, Poisson, T and normal distributions are reviewed.

F.6.2.7 ACSC 3782: RESEARCH METHODS II

Module Title:	**RESEARCH METHODS II**
Code:	ACSC 3782
NQF level:	7
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module Assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Co-requisite:	ACSC 3781: RESEARCH METHODS I

Module description (Content):

Review of basic statistical methods; Comparison between non-parametric and parametric statistics. Non-parametric statistics (Goodness of fit tests; tests of association, Chi Square tests; paired comparisons, Wilcoxon's tests; rank correlation); regression and correlation; Multivariate methods (multiple regression, discriminant analysis, canonical analysis, multidimensional scaling, principal component analysis). Introduction to Statistical Computer packages.

F.6.2.8 ACSC 3702: CROP ECOPHYSIOLOGY

Module title:	**CROP ECOPHYSIOLOGY**
Code:	ACSC 3702
NQF level:	7
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40% (minimum of 2 tests, 1 assignment, 7 practicals)

	Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding environmental crop physiology, namely: 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. Water potential. Water use efficiency. Biological nitrogen fixation. Factors affecting germination, dormancy. Factors affecting root growth and distribution. Factors affecting leaf and stem growth, branching. Flowering. Maturation and ripening. Senescence and abscession. Physiology of stress – abiotic (heat, acidity, water) and biotic stresses.

F.6.2.9 AAEN 3702: CROP STORAGE AND HANDLING

Module title:	**CROP STORAGE AND HANDLING**
Code:	AAEN 3702
NQF level	7
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding farm machinery operation, namely:
The Post harvest system. Properties of crop commodities. Crop Drying. Energy required for drying. Drying methods. Psychometrics. Types of driers. Types and Management of Storage Structures. Processing of Agricultural Crops: Threshing. Shelling. Milling. Oil expression. Handling and Storage of Horticultural and perishable Crops

F.6.2.10 AAEN 3722: FARM MECHANIZATION

Module title	**FARM MECHANIZATION**
Code	AAEN 3722
NQF level	7
National professional standards competencies	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits	8
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals); Examination 60% (01 x 03 hours paper)
Prerequisites	None

Module description (Content):

This module develops a student's understanding, skills and attitude regarding farm machinery operation, namely:
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.

F.6.3 FOURTH YEAR MODULES

F.6.3.1 ACSCS 3810: RESAERCH PROJECT

Module Title:	**RESEARCH PROJECT**
Code:	ACSC 3810
NQA Level:	8
Contact Hours:	Equivalent to 1 hour per week for 28 weeks
Credits:	32
Module Assessment:	The assessment will consist of a research proposal write up and presentation of the research proposal in seminar, presentation of empirical findings in a second seminar, and grading of the final report.
Prerequisites:	ACSC 3781: Research Methods I and ACSC 3782: Research Methods II

Module Description (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 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 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.

F.6.3.2 AACA 3808: FIELD ATTACHMENT II

Module Title:	**FIELD ATTACHMENT II**
Code:	ACSC 3808
NQF Level:	8
Contact Hours:	6 Weeks

Credits: 6
Module Assessment: Final assessment 100% (Attachment report and Oral presentation).
Prerequisite: ACSC 3708: Field Attachment I
Module Description:
This module is designed to 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.

F.6.3.3 ACSC 3801: HORTICULTURE I

Module title:	**HORTICULTURE I**
Code:	ACSC 3801
NQF level:	8
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module Assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (content):
This module develops a student's understanding, skills and attitude regarding horticultural aspects, namely:
Vegetable production: Importance of vegetables in human nutrition. Importance of vegetable production to the economy. Specific environment requirements of vegetables. Specifics in cultivation systems of vegetables. Vegetable nursery management. Main vegetables – fruit vegetables, root vegetables, leaf vegetables, perennial vegetables, leguminous vegetables – their propagation, cultivation, harvest and handling. Indigenous vegetables. Hydroponics. Mushroom production: cultivation technology and species of main importance. Spices, medicinal and pharmaceutical plants. – most common medicinal species – their propagation, cultivation and utilization.

F.6.3.4 ACSC 3821: ENTOMOLOGY

Module title:	**ENTOMOLOGY**
Code:	ACSC 3821
NQF level:	8
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (content):
This module develops a student's understanding, skills and attitude regarding entomology issues, namely:
History of entomology. Effects of insects. Causes of success of insects. Insect structures and life processes: Body parts, maintenance and locomotion, sensory organs, reproduction. Insect classification, life cycles, population dynamics. Insect control measures: preventative, chemical, cultural, biological, physical, integrated insect control. Insects of major crops in Namibia. Pests of stored crops. Integrated pest management.

F.6.3.5 ACSC 3881: SOILF FERTILITY AND PLANT NUTRITION

Module title	**SOIL FERTILITY AND PLANT NUTRITION**
Code	ACSC 3881
NQF level	8
National professional standards competencies	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits	12
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites	None

Module description (content):
This module develops a student's understanding, skills and attitude regarding soil fertility and plant nutrition aspects relevant to crop production, namely:
Soil organic matter: carbon cycle, CO2 global warming, bioassay, response to management practices. Plant nutrients: N,P,K cycles, and micronutrients. Salinity, pH and nutrient availability. Economics of fertilizer use: Liebig Law of the Minimum, soil and plant analysis. Fertilizers: nutrients content, solubility, losses. Soil organisms: detection, identification, nitrogen fixation.

F.6.3.6 AAEN 3881: SOIL AND WATER MANAGEMENT

Module title	**SOIL AND WATER MANAGEMENT**
Code	AAEN 3881
NQF level	8
National professional standards competencies	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits	12
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)

Prerequisites None

Module description (content):

This module develops a student's understanding, skills and attitude regarding irrigated agriculture and soil management issue, namely:
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. 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.

F.6.3.7 ACSC 3882: HORTICULTURE II

Module title:	**HORTICULTURE II**
Code:	ACSC 3882
NQF level:	8
National professional standards competencies:	N/A
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous Assessment 40 % (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hours paper)
Prerequisites:	None

Module description (content):

This module develops a student's understanding, skills and attitude regarding horticultural fruits, ornamentals and stimulants, namely:
Fruit and Nut production: Importance of fruits and nuts in human nutrition. Importance of fruit and nut production to the economy. 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. Stimulants – coffee, tea, cocoa – their propagation, cultivation, harvest and handling. Ornamental and landscape plants – most common inside and outside ornamental species – their propagation, cultivation and utilization.

F.6.3.8 ACSC 3802: PLANT PATHOLOGY

Module title:	**PLANT PATHOLOGY**
Code:	ACSC 3802
NQF level:	8
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40% (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hour paper)
Prerequisites:	None

Module description (content):

This module develops a student's understanding, skills and attitude regarding plant protection issues, namely:
Definition of disease. For viruses, bacteria, fungi: characteristics of group, major species of agricultural importance, effects on crop, dispersal mechanisms. Epidemiology. Methods for assessing crop losses. Methods of control: agronomic, tolerant or resistant crops and cultivars, fungicides used, seed treatment. Effects of fungicides on environment. Biological control. Costs/benefits of control methods.

F.6.3.9 ACSC 3822: PLANT BIOTECHNOLOGY

Module title:	**PLANT BIOTECHNOLOGY**
Code:	ACSC 3822
NQF level:	8
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module assessment:	Continuous Assessment 40% (minimum of 2 tests, 1 assignment, 7 practicals) Examination 60% (01 x 03 hour paper)
Prerequisites:	None

Module description (content):

Plant tissue culture – concept of totipotency, culture media composition and environmental conditions. Micro-propagation. Direct and indirect organogenesis and non-zygotic embryogenesis. Embryo culture. Protoplast culture and regeneration. Production of haploid plants. Production of secondary metabolites. Cryopreservation. Basics of molecular breeding. DNA isolation and amplification (PCR). Molecular analysis of DNA, RNA, and proteins. Recombinant DNA. Direct and indirect gene transfer. GMO and Terminator Gene Technology. Genetic makers.

F.6.3.10 AAEN 3802: LAND USE PLANNING

Module title:	**LAND USE PLANNING**
Code:	AAEN 3802
NQF level:	8
National professional standards competencies:	N/A
Contact hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8

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

Prerequisites: None

Module description (content):

This module develops a student's understanding, skills and attitude regarding land use planning and land reform issues, namely:
Concepts of land use planning. Environmental Impact Assessment. Soil morphology: depth, texture, structure, color. Soil profile characterization (layers, horizons, and diagnostic horizons). Soil classification (nomenclature and approach). Land evaluation: classification for arable and irrigated cropping, livestock and wood production. Land use systems and productivity. Computer tools (Geographical Positioning System, Geographical Information System and Remote Sensing). Land use laws and policies: History and evolution of land tenure in Namibia. Commercial Land Reform Act, Communal Land Reform Act.

G. B.SC. (HONS) AGRICULTURE (FOOD SCIENCE & TECHNOLOGY)

G.1 FIRST YEAR

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.

COURSE	CODE	COURSE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	42	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCS	3429	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	42	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3532	Chemistry for Life Sciences	5	04/56	42	16
SPHY	3412	Physics for Life Science II	4	04/56	42	16
SBLG	3512	Diversity of Life	5	04/56	42	16
SMAT	3512	Precalculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS						**88**
TOTAL FIRST YEAR CREDITS						**160**

G.2 SECOND YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	3681	Principles of Microeconomics	6	03/42	0	12
AGEC	3691	Rural Sociology	6	03/42	0	12
AASC	3601	Genetics	6	02/28	21	8
ACSC	3681	Plant Science	6	03/42	28	12
AFST	3601	Human Nutrition	6	02/28	14	8
AFST	3621	General Microbiology	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**60**
Semester 2						
AAEN	3602	Agricultural Engineering	6	02/28	21	8
AGEC	3682	Production Economics	6	03/42	0	12
AGEC	3692	Principles of Macroeconomics	6	03/42	0	12
AASC	3612	Biochemistry	6	03/42	21	16
AASC	3602	Livestock Production Systems	6	02/28	21	8
ACSC	3682	Agronomy	6	03/42	42	12
AFST	3602	Food Technology	6	02/28	21	8
TOTAL SEMESTER 2 CREDITS						**76**
TOTAL SECOND YEAR CREDITS						**136**

G.3 THIRD YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AFST	3781	Food Chemistry	7	03/42	21	12
AFST	3791	Food Microbiology	7	03/42	21	12
AACA	3708	Field Attachment I	7	0	0	6
AFSC	3781	Post Harvest Technology	7	03/42	21	12
AFSC	3791	Food Processing Technology	7	03/42	21	12
AFSF	3781	Fruits and Vegetable Technology	7	03/42	21	12
ACSC	3781	Research Methods I	7	03/42	21	12
TOTAL SEMESTER 1 CREDITS						**78**
Semester 2						
AFST	3782	Food Analysis, Instrum & Sen Eva	7	03/42	21	12
AFST	3792	Meat Science and Technology	7	03/42	21	12
AFST	3712	Principles of Food Engineering	7	04/56	14	16
ACSC	3782	Research Methods II	7	03/42	28	12
AGEC	3782	Agricultural Marketing	7	03/42	14	12
TOTAL SEMESTER 2 CREDITS						**64**
TOTAL THIRD YEAR CREDITS						**142**

G.4 FOURTH YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AFST	3810	Research Project	8	04/56	42	16
AFST	3801	Sea Foods Technology	8	02/28	21	8
AFST	3881	Dairy Science and Technology	8	03/42	42	12
AFST	3891	Applied Food Engineering	8	03/42	14	12
AFST	3821	Edible Fats and Oils Technology	8	03/42	21	8
AACA	3808	Field Attachment II	8	0	0	6
TOTAL SEMESTER 1 CREDITS						**62**
Semester 2						
AFST	3810	Research Project	8	04/56	42	16
AFST	3882	Cereal Science and Technology	8	03/42	21	12
AFST	3802	Food Packaging, Storage and Distribution	8	02/28	21	8
AFST	3822	Plant Equipment and Management	8	02/28	28	8
AFST	3842	Quality Management Systems	8	02/28	21	8
AGEC	3892	Entrepreneurship & Agric Bus Mgt	8	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**64**
TOTAL FOURTH YEAR CREDITS						**126**

FOOD SCIENCE DEPARTMENT: MODULE PRE- & CO-REQUISITES

YEAR	MODULE	PRE-REQUISITE	CO-REQUISITE
3	FST 3781: Food Chemistry	ASC 3612: Biochemistry	
	FST 3791: Food Microbiology	FST 3621: General Microbiology	
	FSC 3791: Food Processing Technology	FST 3602: Food Technology	
	FSF 3781: Fruit & Veg Technology		FST 3791: Food Processing Technology
	FST 3792: Meat Science & Technology	FST 3602: Food Technology	
4	FST 3801: Sea Food Technology	FST 3602: Food Technology	
	FST 3881: Dairy Science and Technology	FSC 3791: Food Processing Technology; FST 3791: Food Microbiology	
	FST 3821: Edible Fats & Oils Technology	FST 3781: Food Chemistry	
	FST 3822: Plant Equipment and Management	FSC 3791: Food Processing Technology	
	FST 3842: Quality Management Systems	FST 3602: Food Technology	

G.5 MODULE DESCRIPTORS: Basic Science & University Core Modules

G.5.1 FIRST YEAR MODULES

G.5.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

G.5.1.2 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

G.5.1.3 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

G.5.1.4 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title: **ENGLISH FOR ACADEMIC PURPOSES**
Code: ULEA 3419
NQF level: 4
Contact hours: 4 periods per week
Credits: 16
Module assessment: Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites: ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC
Module description (Content): This course 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.

G.5.1.5 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title: **INTRODUCTION TO BIOLOGY**
Code: SBLG 3411
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 domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

G.5.1.6 SBLG 3512: DIVERSITY OF LIFE

Module title: **DIVERSITY OF LIFE**
Code: SBLG 3512
Course Equivalent: NSSC (/HIGH GRADE) Biology
NQF level: 5
Contact hours: 4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits: 16
Module assessment: Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites: NSCC (Biology C or better)
Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.

Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field

G.5.1.7 SPHY 3401: PHYSICS FOR LIFE SCIENCES I

Module title:	**PHYSICS FOR LIFE SCIENCES I**
Code:	SPHY3401
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.

G.5.1.8 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title:	**PHYSICS FOR LIFE SCIENCES II**
Code:	SPHY 3412
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.

G.5.1.9 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, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

G.5.1.10 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.

G.5.1.11 SCHM 3412: CHEMISTRY FOR LIFE SCIENCES

Module Title:	**CHEMISTRY FOR LIFE SCIENCES**
Code:	SCHM3412
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.

G.5.1.12 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.

(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.)

G.6 MODULE DESCRIPTORS: FOOD SCIENCE AND TECHNOLOGY

G.6.1 SECOND YEAR MODULES

G.6.1.1 AFST 3601: HUMAN NUTRITION

Module Title:	**HUMAN NUTRITION**
Code:	AFST 3601
NQF Level:	6
Contact Hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module Assessment:	Continuous Assessment: 40% (at 3 assessments); Examination: 60% (One 2 hr exam paper)
Prerequisite:	None

Module Description (Content):
The module develops student' knowledge and skills and provides information regarding:
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. Students will be able to carry out anthropometric measurements: Body Mass Index (BMI), Basal Metabolic Rate (BMR) and Physical Activity Level (PAL); determine nutritional disorders resulting from deficiencies and excesses e.g. Blindness, Marasmus, Kwashiorkor and Obesity and other macronutrient deficiencies such as Rickets and Anaemia. Students will also be able to formulate balanced ration for each group of people. Students will acquire knowledge in the areas of preservation of nutrients, food intolerances and allergies. The role of nutrition with respect to HIV/AIDS will be covered.

G.6.1.2 AFST 3621: GENERAL MICROBIOLOGY

Module Title: **GENERAL MICROBIOLOGY**
Code: AFST 3621
NQF Level: 6
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: 100%: 60% 2 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: None
Module Description (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.

G.6.1.3 AFST 3602: FOOD TECHNOLOGY

Module Title: **FOOD TECHNOLOGY**
Code: AFST 3602
NQF Level: 6
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: 100%: 60% 2 hr exam papers & 40% tests, assignments & practicals.
Prerequisite: None
Module Description (Content):
This course will introduce students to food industry in Namibia and SADC region; 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.

G.6.2 THIRD YEAR MODULES

G.6.2.1 AFST 3781: FOOD CHEMISTRY

Module Title: **FOOD CHEMISTRY**
Code: AFST 3781
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisite: AASC 3612: Biochemistry
Module Description (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. Food contaminants.

G.6.2.2 AFST 3791: FOOD MICROBIOLOGY

Module Title: **FOOD MICROBIOLOGY**
Code: AFST 3791
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: AFST 3621: General Microbiology
Module Description (Content):
This course is intended to provide students with knowledge on microorganisms of interest in food. The laboratory techniques used in the isolation, enumeration and identification of microorganisms in food. Students are also taught the kinetics of multiplication of microorganisms, microbiological principles of food processing and preservation as well as food poisoning and toxicology. Sampling and sampling plans, indices of sanitation in food, biochemical reactions of microorganisms in food and application of genetic engineering to food.

G.6.2.3 AACA 3708: FIELD ATTACHMENT I

Module Title: **FIELD ATTACHMENT I**
Code: AACA 3708
NQF Level: 7
Contact Hours: 3 Weeks
Credits: 6
Prerequisite: None
Module Assessment: Final assessment 100% (Attachment report and Oral presentation).

Module Description (Content):
The module is designed to expose students to practical experience of actual operations on farms, agro-industries, and research institutions in Namibia. They are expected to observe many different aspects of operations, and participate in physical work and management of operations.

G.6.2.4 AFSC 3781: POST HARVEST TECHNOLOGY

Module Title: **POST HARVEST TECHNOLOGY**
Code: AFSC 3781
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: None
Module Description (Content):
This course provides a student with an excellent understanding of physiological and biochemical characteristics of agricultural products with respect to their maturation, ripening and agricultural products storage life. The student has a chance to be introduced to methods of post-harvest handling of agricultural product, traditional and modern methods of drying and storage of grain in Namibia.

G.6.2.5 AFSC 3791: FOOD PROCESSING TECHNOLOGY

Module Title: **FOOD PROCESSING TECHNOLOGY**
Code: AFSC 3791
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: AFST 3602: Food Technology
Module Description (Content):
This course develops the students understanding of the principles and practices employed in food processing. The technologies employed in unit operations common to the food industry are covered. In addition, students are given an understanding of food preservation techniques and factors that affect food quality and shelf life.

G.6.2.6 AFSF 3781: FRUIT AND VEGETABLE TECHNOLOGY

Module Title: **FRUITS AND VEGETABLE TECHNOLOGY**
Code: AFSF 3781
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credit: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Co-requisites: AFSC 3791: Food Processing Technology
Module Description (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 analyze 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,. 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).

G.6.2.7 AFST 3782: FOOD ANALYSIS, INSTRUMENTATION AND SENSORY EVALUATION

Module Title: **FOOD ANALYSIS, INSTRUMENTATION AND SENSORY EVALUATION**
Code: AFST 3782
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: None
Module Description (Content):
This course builds on concepts and principles of providing students with skills and dispositions regarding sensory evaluation and analysis. 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. It also investigates the application of sensory evaluation; types of panels, types of tests and their specific functions when conducting statistical analysis and during the interpretation of data. The application of a SACCP system and Product development will be covered.

G.6.2.8 AFST 3792: MEAT SCIENCE AND TECHNOLOGY

Module Title: **MEAT SCIENCE AND TECHNOLOGY**
Code: AFST 3792
NQF Level: 7
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisite: AFST 3602: Food Technology

Module Description (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 procedures. Selected topics related to animal anatomy. Grading and pricing of carcasses. Slaughterhouse hygiene. Carcass composition, 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.

G.6.2.9 AFST 3712: PRINCIPLES OF FOOD ENGINEERING

Module Title:	**PRINCIPLES OF FOOD ENGINEERING**
Code:	AFST 3712
NQF Level:	7
Contact Hours:	Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits:	16
Module Assessment:	100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisites:	None.

Module Description (Content):
This course introduces the student to concepts of process engineering through the quantitative description of unit operations related to food processing operations. Students are given an understanding of how to perform material and energy balances .In addition, the application of Pressure/ Enthalpy charts to size mechanical refrigeration cycle components is taught.

G.6.3 FOURTH YEAR MODULES

G.6.3.1 AFST 3810: RESEARCH PROJECT

Module Title:	**RESEARCH PROJECT**
Code:	AFST 3810
NQF Level:	8
Contact Hours:	Equivalent to 1 hour per week for 28 weeks
Credits:	32
Module Assessment:	100% (The assessment will consist of a research proposal write up and presentation of the research proposal in seminar, presentation of empirical findings in a second seminar, and grading of the final report)
Prerequisites:	ACSC 3781: Research Methods I and ACSC 3782: Research Methods II

Module Description (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 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 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.

G.6.3.2 AFST 3801: SEA FOODS TECHNOLOGY

Module Title:	**SEA FOODS TECHNOLOGY**
Code:	AFST 3801
NQF Level:	8
Contact Hours:	Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	8
Module Assessment:	100%: 60% 2 hr exam papers & 40% tests, assignments & practicals.
Prerequisites:	AFST 3602: Food Technology

Module Description (Content):
This module investigates key issues in seafood technology such as fishing industry in Namibia and Fish-catching technology. The module focuses on the composition and chemistry of seafood components. The module 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 module 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.

G.6.3.3 AFST 3881: DAIRY SCIENCE AND TECHNOLOGY

Module Title:	**DAIRY SCIENCE AND TECHNOLOGY**
Code:	AFST 3881
NQF Level:	8
Contact Hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credit:	12
Module Assessment:	100%: 60% Products Development report & 40% Oral presentation.
Prerequisites:	AFSC 3791: Food Processing Technology and AFST 3791: Food Microbiology

Module Description (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.

G.6.3.4 AFST 3891: APPLIED FOOD ENGINEERING

Module Title: **APPLIED FOOD ENGINEERING**
Code: AFST 3891
NQF Level: 8
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% 3 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: None
Module Description:
This course develops the students understanding of the application of engineering to common food processing operations. The practical aspects relating to the design, operation, selection and evaluation of process and auxiliary equipment are given. Students are also taught basic control theory as well as the applied aspects of process automation in the food processing industry.

G.6.3.5 AFST 3821: EDIBLE FATS AND OILS TECHNOLOGY

Module Title: **EDIBLE FATS AND OILS TECHNOLOGY**
Code: AFSC 3821
NQF Level: 8
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: 100%: 60% 2 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: AFST 3781: Food Chemistry
Module Description (Content):
Key concepts covered in the module include a 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.

G.6.3.6 AACA 3808: FIELD ATTCHMENT II

Module Title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF Level: 8
Contact Hours: 6 Weeks
Credits: 6
Module Assessment: Final assessment 100% (Attachment report and Oral presentation).
Prerequisite: AFST 3708: Field Attachment I
Module Description:
This module is designed to 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.

G.6.3.7 AFST 3882: CEREAL SCIENCE AND TECHNOLOGY

Module Title: **CEREAL SCIENCE AND TECHNOLOGY**
Code: AFST 3882
NQF Level: 8
Contact Hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: 100%: 60% Products Development report & 40% Oral presentation.
Prerequisites: None
Module Description (Content):
This module 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 module. 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 doughs and processing and characterization of cereal products. The module exposes the student to concepts involved in Baking technology e.g. bread, cakes, and biscuits; Breakfast cereals e.g. cornflakes, weetabix, puff products; Pasta Products e.g. spaghetti, macaroni and noodles. Key concepts, theories and applications in Brewing technology e.g. malting, malt milling, yeast growth kinetics, fermenter design, wort preparation and fermentation to beer, beer ageing and Quality assurance and control will be covered.

G.6.3.8 AFST 3802: FOOD PACKAGING, STORAGE AND DISTRIBUTION

Module Title: **FOOD PACKAGING, STORAGE AND DISTRIBUTION**
Code: AFST 3802
NQF Level: 8

Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credit: 8
Module Assessment: 100%: 60% 2 hr exam papers & 40% tests, assignments & practicals.
Prerequisites: None
Module Description (Content):
Students 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.

G.6.3.9 AFST 3822: PLANT EQUIPMENT AND MANAGEMENT

Module Title: **PLANT EQUIPMENT AND MANAGEMENT**
Code: AFST 3822
NQF Level: 8
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credit: 8
Module Assessment: 100%: 60% Products Development report & 40% Oral presentation.
Prerequisites: AFSC 3791: Food Processing Technology
Module Description (Content):
This module develops students understanding, skills, and dispositions regarding issues such as: Site selection for food processing, plant layout and safety design, water sources and quality, potable water treatment, sewage treatment, boiler water treatment, electrical power installation and safety, steam generation and utilization, solar energy utilization including wood as fuel, refrigeration and cooling system. Students will also learn how utilize compressed air and vacuum in food processing, preventive maintenance of machineries, industrial colour codes, plant records and accounts.

G.6.3.10 AFST 3842: QUALITY MANAGEMENT SYSTEMS

Module Title: **QUALITY MANAGEMENT SYSTEMS**
Code: AFST 3842
NQF Level: 8
Contact Hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: 100%: 60% Products Development report & 40% Oral presentation.
Prerequisite: AFST 3602: Food Technology
Module Description (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 and 14 001; Cleaner productions, and Food risk assessment analysis.

H. B.SC. (HONS) FISHERIES AND AQUATIC SCIENCES

H.1 FIRST YEAR

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.

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	42	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	42	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
TOTAL SEMESTER 1 CREDITS (L 4 = 56; L 5 = 60)						**72**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3532	Chemistry for Life Sciences	5	04/56	42	16
SPHY	3412	Physics for Life Science II	4	04/56	42	16
SBLG	3512	Diversity of Life	5	04/56	42	16
SMAT	3512	Pre-calculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS					**88**	
TOTAL FIRST YEAR CREDITS						**160**

H.2 SECOND YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	3681	Principles of Microeconomics	6	03/42	0	12
AGEC	3691	Rural Sociology	6	03/42	0	12
AASC	3601	Genetics	6	02/28	21	8
AIES	3641	Environmental Science	6	02/28	21	8
ANRW	3681	Biosystematics	6	03/42	21	12
AFST	3621	General Microbiology	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**64**
Semester 2						
AGEC	3682	Production Economics	6	03/42	0	12
AGEC	3692	Principles of Macroeconomics	6	03/42	0	12
AASC	3612	Biochemistry	6	04/56	21	16
AIES	3622	Climatology and Hydrology	6	02/28	14	8
ANRF	3682	Water Chemistry	6	03/42	21	12
ANRF	3692	Natural Resource Economics	6	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**70**
TOTAL SECOND YEAR CREDITS						**134**

H.3 THIRD YEAR

COURESE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
ANRF	3781	Physical Oceanography	7	03/42	21	12
ANRF	3711	Fish Biology and Marine Animal Physiology	7	04/56	28	16
AACA	3708	Field Attachment I	7	0	0	6
ANRF	3791	Integrated Coastal Zone Management	7	03/42	14	12
ANRB	3781	Business Management	7	03/42	28	12
ACSC	3781	Research Methods I	7	03/42	21	12
TOTAL SEMESTER 1 MODULES						**68**
Semester 2						
ANRF	3782	Microbiol & Chemistry of Seafood	7	03/42	42	12
ANRF	3792	Aquatic Ecology	7	03/42	21	12
ANRC	3782	Chemical and Biological Oceanography	7	03/42	14	12
ANRC	3792	Conservation Biology	7	03/42	21	12
ANRA	3782	Aquatic Invertebrate Biology	7	03/42	14	12
ACSC	3782	Research Methods II	7	03/42	21	12
TOTAL SEMESTER 2 MODULES						**72**
TOTAL THIRD YEAR CREDITS						**140**

H.4 FOURTH YEAR

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
ANRF	3810	Research Project	8	04/56	42	16
AACA	3808	Field Attachment II	8	0	0	6
ANRF	3881	Fisheries Economics	8	03/42	42	12
ANRF	3811	Population Dynamics for Aquatic Resources	8	04/56	42	16
AGEC	3881	Project Planning and Management	8	03/42	21	12
TOTAL SEMESTER 1 CREDITS						**62**
Semester 2						
ANRF	3810	Research Project	8	04/56	42	16
ANRF	3812	Fish Processing and Quality Control	8	04/56	28	16
ANRF	3832	Fisheries Management	8	04/56	42	16
ANRF	3851	Aquaculture	8	04/56	21	16
TOTAL SEMESTER 2 CREDITS						**64**
TOTAL FOURTH YEAR CREDITS						**126**

DEPARTMENT OF FISHERIES & AQUATIC SCIENCES: MODULE PRE- & CO-REQUISITES

YEAR	MODULE	PRE-REQUISITE	CO-REQUISITE
3	NRF 3791: Integrated Coastal Zone Management	NRE 3601: Environmental Science	
	NRF 3782: Microbiology & Chemistry of Seafood	FST 3621: General Microbiology; ASC 3612: Biochemistry	
	NRC 3792: Conservation Biology	NRE 3601: Environmental Science	
4	NRF 3881: Fisheries Economics	NRF 3692: Natural Resource Economics	
	NRF 3811: Population Dynamics	CSC 3782: Research Methods II	
	NRF 3812: Fish Processing & Quality Control	NRF 3782: Microbiology & Chemistry of Seafood	
	NRF 3832: Fisheries Management	NRF 3692: Natural Resource Economics	
	NRF 3852: Aquaculture	NRF 3711: Fish Biology & Marine Animal Physiology; NRF 3682: Water Chemistry	

DEPARTMENT OF FISHERIES & AQUATIC SCIENCES: MODULE EQUIVALENTS

YEAR	OLD MODULES	NEW MODULES
3	NRF 3391: Biostatistics I	CSC 3781: Research Methods I
	NRF 3392: Biostatistics II	CSC 3782: Research Methods II

H.5 MODULE DESCRIPTORS: Basic Science & University Core Modules

H.5.1 FIRST YEAR MODULES

H.5.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

H.5.1.2 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None

Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

H.5.1.3 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

H.5.1.4 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title: **ENGLISH FOR ACADEMIC PURPOSES**
Code: ULEA 3419
NQF level: 4
Contact hours: 4 periods per week
Credits: 16
Module assessment: Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites: ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC
Module description (Content): This course 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.

H.5.1.5 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title: **INTRODUCTION TO BIOLOGY**
Code: SBLG 3411
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 domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over, recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

H.5.1.6 SBLG 3512: DIVERSITY OF LIFE

Module title: **DIVERSITY OF LIFE**
Code: SBLG 3512
Course Equivalent: NSSC (/HIGH GRADE) Biology
NQF level: 5
Contact hours: 4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits: 16
Module assessment: Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites: NSCC (Biology C or better)

Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.
Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field

H.5.1.7 SPHY 3401: PHYSICS FOR LIFE SCIENCES I

Module title:	**PHYSICS FOR LIFE SCIENCES I**
Code:	SPHY3401
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.5.1.8 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title:	**PHYSICS FOR LIFE SCIENCES II**
Code:	SPHY 3412
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.

H.5.1.9 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, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

H.5.1.10 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.

H.5.1.11 SCHM 3412: CHEMISTRY FOR LIFE SCIENCES

Module Title: **CHEMISTRY FOR LIFE SCIENCES**
Code: SCHM3412
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.

H.5.1.12 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.

(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.)

H.6 MODULE DESCRIPTORS: B SC FISHERIES AND AQUATIC SCIENCES

H.6.1 SECOND YEAR MODULES

H.6.1.1 ANRW 3681: BIOSYSTEMATICS

Module title: **BIOSYSTEMATICS**
Code: ANRW 3681
NQF level: 6
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examinations (60%): (1 x 3 hour examination paper)
Prerequisites: None

Module description (Content):
Principles and practices of animal and plant taxonomy with emphasis on the phylogenetic relationships and evolutionary features in classification. Detailed study of selected locally important families of plants and animals. Introduction to novel technologies in systematics; Evolution and diversity of marine and freshwater fishes. Taxonomy and biogeography of the fish fauna. Introduction to macrophytes.

H.6.1.2 ANRF 3682: WATER CHEMISTRY

Module:	**WATER CHEMISTRY**
Module Code:	ANRF 3682
NQF Level:	6
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 1x03 hour examination paper
Prerequisites:	SCHM 3412 Chemistry for Life Sciences

Module Description (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 oxygen; decomposition of organic matter; photosynthesis and pH. Nutrients and nutrient cycles: phosphorus, nitrogen, sulphur, iron and manganese; silicon and other micro-nutrient constituents. Conductivity.

H.6.1.3 ANRF 3692: NATURAL RESOURCE ECONOMICS

Module Title:	**NATURAL RESOURCE ECONOMICS**
Code:	ANRF 3692
NQF level:	6
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module Assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites:	None

Module description (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.

H.6.2 THIRD YEAR MODULES

H.6.2.1 ACSC 3781: RESEARCH METHODS I

Module Title:	**RESEARCH METHODS I**
Code:	ACSC 3781
NQF level:	6
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module Assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites:	None

Module description (Content):
Statistical packages, scientific research, objectives of experiments, principles of experimental design and experimental designs, Topics covered include: Analysis of Variance, standard experimental designs, factorial experiments, linear regression and correlation, transformations, non-parametric statistical techniques, mean comparisons. Procedures for implementing research project and presentation of research results. In addition, probability, Bayes' theorem, combinations and permutations, binomial, Poisson, T and normal distributions are reviewed.

H.6.2.2 ANRF 3781: PHYSICAL OCEANOGRAPHY

Module:	**PHYSICAL OCEANOGRAPHY**
Module Code:	ANRF 3781
NQF Level:	7
Contact hours:	Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits:	12
Module assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites:	SPHY 3512 Physics for Life Science II; SMAT 3511 Basic Mathematics

Module Description (Content):
Marine geology and ocean floor processes. Coastal processes: accumulation; sediment transport. Tidal mechanisms. Eddy diffusion and turbulence. Waves. Coriolis force and Eckman transport. Wind driven and geostrophical currents, vertical water movement, oceanic gyres and meanders. Physical and oceanographical instrumentation. Remote Sensing.

H.6.2.3 ANRF 3711: FISH BIOLOGY AND MARINE ANIMAL PHYSIOLOGY

Module Title:	**FISH BIOLOGY AND MARINE ANIMAL PHYSIOLOGY**
Code:	ANRF3711
NQF level:	7
Contact hours:	Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits:	16
Module Assessment:	Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Pre-requisites:	None

Module description (Content):
General anatomy and physiology of agnatha, condrichthyes,osteichthyes and other marine animals: mechanisms dealing with respiration and circulation; feeding behaviour, thermoregulation; osmoregulation and excretion; skeleton, muscle and movement; central nervous system, endocrine system and integration.

H.6.2.4 AACA 3708: FIELD ATTACHMENT I

Module title: **FIELD ATTACHMENT I**
Code: AACA 3708
NQF level: 6
Contact hours: 6 weeks Field Attachment
Credits: 4
Module assessment: 40% (Field Attachment Seminar Presentations). 60% (Field attachment Reports)
Prerequisites: None
Module description (Content):
At the end of the Second year students will be attached to selected institutions or hands on experience. An attachment report and an oral presentation constitute the total assessment mark.

H.6.2.5 ANRF 3791: INTEGRATED COASTAL ZONE MANAGEMENT

Module Title: **INTEGRATED COASTAL ZONE MANAGEMENT**
Code ANRF 3791
NQF level 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: ANRE 3601: Introduction to Environmental Science
Module description (Content)
Potential impacts by climate change and direct human interference on coastal systems. Impact assessment: scooping of habitats, focusing and validation of communities and species, identification and evaluation of impacts. Monitoring. ICZM strategies: coordinated retreat, adaptation (sustainability), protection. Ecological and sociological implications. Internal functioning of companies; company decision making and the influence of externally set conditions with emphasis on Namibian based companies.

H.6.2.6 ANRB 3781: BUSINESS MANAGEMENT

Module Title: **BUSINESS MANAGEMENT**
Code: ANRB 3781
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Pre-requisites: None
Module description (Content):
Nature of business and organization; The business environment; Agriculture as a business; The exploitation natural resources in business; Special factors affecting the decision making process in agriculture and natural resources exploitation; The function of management; Management styles; Financial management and planning; Business analysis and control; Decision theory and decision planning; Measures of efficiency; Analytical sequences of problem solving; Corporate recovery; Employee compensation. Social and other social factors in management: Theories of motivation and group dynamics; Management of change; Communication in business, Business law.

H.6.2.7 ACSC 3782: RESEARCH METHODS II

Module Title: **RESEARCH METHODS II**
Code: ACSC 3782
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: ACSC 3781: RESEARCH METHODS I
Module description (Content):
Introduction / review of basic statistical methods; Comparison between non-parametric and parametric statistics. Non-parametric statistics (Goodness of fit tests; tests of association, Chi Square tests; paired comparisons, Wilcoxon's tests; rank correlation); regression and correlation; Multivariate methods (multiple regression, discriminant analysis, canonical analysis, multidimensional scaling, principal component analysis). Introduction to Statistical Computer packages.

H.6.2.8 ANRF 3782: MICROBIOLOGY AND CHEMISTRY OF SEAFOOD

Module Title: **MICROBIOLOGY AND CHEMISTRY OF SEAFOOD**
Code: ANRF 3782
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Pre-requisites: AFST 3621 : General Microbiology and AASC 3612 : Biochemistry
Module description (Content):
Laboratory techniques for identification, enumeration and isolation of microorganisms (ie. molecular DNA technology). .Proximal composition of fish and other types of seafood. Spoilage pattern of fish and seafood; food additives and contaminants. Nutritional indices of seafood.

H.6.2.9 ANRF 3792: AQUATIC ECOLOGY

Module: **AQUATIC ECOLOGY**
Module Code: ANRF 3792
NQF Level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module Description (Content):
Abiotic parameters influencing productivity of aquatic systems. Diversity, structure and functioning of the various community structures: phytoplankton, zooplankton and benthos; direct and interact interactions between the biotic and abiotic components of the aquatic systems. Functional webs. Influence of competition. Predation and symbiosis and commensalisms on community structure. Reproduction tactics, growth, survival and fecundity of producers and consumers.

H.6.2.10 ANRC 3782: CHEMICAL AND BIOLOGICAL OCEANOGRAPHY

Module: **CHEMICAL AND BIOLOGICAL OCEANOGRAPHY**
Module Code: ANRC 3782
NQF Level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Co-requisites: ANRF 3781 Physical Oceanography
Module Description (Content):
Abiotic factors: Properties of sea water and sediment – sea water reactions. Dissolved nutrients, nutrient cycling and chemical – biological interactions. Physical – chemical interactions in oceanic and estuarine environment and marine system pollution scenario. Dissolved gases and interaction with atmosphere. Irradiance/UVR and heat flux. Oceanographic instrumentation and methods of measurement. 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. Types of biotopes: polar, temperate and tropical systems. Marine system carrying capacity. Sampling gear and methods of species biomass assessment.

H.6.2.11 ANRC 3792: CONSERVATION BIOLOGY

Module Title: **CONSERVATION BIOLOGY**
Code: ANRC 3792
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: ANRE 3601: Environmental Science
Module description (Content):
Application of principles from genetics and ecology to problems of conservation of biodiversity in aquatic environments: Fitness and viability of small populations, community processes and species richness, aquatic ecology and habitat deterioration; conservation strategies.

H.6.2.12 ANRA 3782: AQUATIC INVERTEBRATE BIOLOGY

Module title: **AQUATIC INVERTEBRATE BIOLOGY**
Code: ANRA 3782
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 1 x 3 hour examination paper
Prerequisites: None
Module description (Content):
The 'Bauplan' concept, definition of major animal phyla, basic biological functions and corresponding organs or organ systems, biology and functional morphology of major aquatic invertebrate phyla, evolutionary aspects.

H.6.3 FOURTH YEAR MODULES

H.6.3.1 ANRF 3810: RESEARCH PROJECT

Module Title: **RESEARCH PROJECT**
Code: ANRF 3810
NQF level: 8
Contact hours: Individual student consultation for 28 weeks: equivalent to 1 hour a week.
Credits: 32
Module Assessment: 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.
Prerequisites: ACSC 3781: Research Methods I and CSC 3782: Research Methods II
Module description (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.

H.6.3.2 AACA 3808: FIELD ATTACHMENT II

Module title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF level: 8
Contact hours: Six weeks of Field Attachment
Credits: 6
Module assessment: 40% (Field Attachment Seminar Presentations) 60% (Field attachment Reports)
Prerequisites: None
Module description (content):
At the end of the Third Year students will be attached to selected institutions or hands on experience. An attachment report and an oral presentation constitute the total assessment mark.

H.6.3.3 ANRF 3811: POPULATION DYNAMICS FOR AQUATIC RESOURCES

Module Title: **POPULATION DYNAMICS FOR AQUATIC RESOURCES**
Code: ANRF 3811
NQF level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous assessment (40%): at least three assessments. Examination (60%): 01 x 03 hour examination paper
Pre-requisites: ACSC 3782 : Research Methods II
Module description (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.

H.6.3.4 ANRF 3881: FISHERIES ECONOMICS

Module: **FISHERIES ECONOMICS**
Module Code: ANRF 3881
NQF Level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments. Examination (60%): 01 x 03 hour examination paper
Prerequisites: ANRF 3632: Natural Resource Economics
Module Description (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.

H.6.3.5 ANRA 3852: AQUACULTURE

Module: **AQUACULTURE**
Module Code: ANRA 3852
NQF Level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module assessment: Continuous assessment (40%): at least three assessments. Examination (60%): 01 x 03 hour examination paper
Prerequisites: NRF 3711: Fish Biology and Marine Animal Physiology and ANRF 3682 Water Chemistry
Module Description (content):
A consideration of the biological, engineering and economic factors involved in the establishment and operations of different marine and freshwater aquaculture systems: Systems and practices currently in use both overseas and in Africa;. Impact of aquaculture systems on the environment and regulations governing aquaculture practices in Africa and elsewhere. Fish diseases and water quality; nutrition and growth indices; broodstock management and larval rearing

H.6.3.6 ANRF 3812: FISH PROCESSING AND QUALITY CONTROL

Module Title: **FISH PROCESSING AND QUALITY CONTROL**
Code: ANRF 3812
NQF level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous assessment (40%): at least three assessments. Examination (60%): 01 x 03 hour examination paper
Co-requisites: ANRF 3782: Microbiology and Chemistry of Seafood.
Module description (content):
Fish handling, processing and preservation, packaging-material and techniques, transportation and distribution of products. Fish quality, processing hygiene, food safety, HACCP systems, food poisoning and infection, types of toxicity and its biochemical aspects. Sensory evaluation. Construction of HACCP system in the fishing industry; prerequisite programmes

H.6.3.7 ANRF 3882 : FISHERIES MANAGEMENT

Module Title: **FISHERIES MANAGEMENT**
Code: ANRF 3832
NQF level: 8

Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous assessment (40%): at least three assessments. Examination (60%): 01 x 03 hour examination paper
Pre-requisites: ANRF 3692 : Natural Resource Economics
Module description (content):
Introduction to theories of organization, planning, management and decision making; legislative framework for fisheries management; 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 surveillance; other participatory methods); fish and seafood marketing; management costs; characteristics of subsistence artisanal vs. industrial and commercial fisheries; national laws (SADC).

I. B.SC. (HONS) INTEGRATED ENVIRONMENTAL SCIENCE (Ogongo Campus)

I.1 FIRST YEAR

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.

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	42	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCSI	3109	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	42	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
TOTAL SEMESTER 1 CREDITS (L 4 = 56; L 5 = 60)						**72**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3532	Chemistry for Life Sciences	5	04/56	42	16
SPHY	3412	Physics for Life Sciences	4	04/56	42	16
SBLG	3522	Diversity of Life	5	04/56	42	16
SMAT	3512	Pre-calculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS (L 4 = 40; L 5 = 48)						**88**
TOTAL FIRST YEAR CREDITS (L4 = 104; L5 = 108)						**152**

I.2 SECOND YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AGEC	3681	Principles of Microeconomics	6	03/42	0	12
AGEC	3691	Rural Sociology	6	03/42	0	12
AASC	3601	Genetics	6	02/28	21	8
AIES	3601	Ecology	6	02/28	14	8
AIES	3621	Principles of Wildlife Management	6	02/28	14	8
AIES	3641	Environmental Science	6	02/28	21	8
AFST	3621	General Microbiology	6	02/28	21	8
TOTAL SEMESTER 1 CREDITS						**68**
Semester 2						
AGEC	3692	Principles of Macroeconomics	6	03/42	0	12
AASC	3612	Biochemistry	6	04/56	21	16
AIES	3682	Plant Physiology	6	03/42	14	12
AIES	3602	General Soil Science	6	02/28	21	8
AIES	3622	Climatology and Hydrology	6	02/28	14	8
ANRF	3692	Natural Resource Economics	6	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**68**
TOTAL SECOND YEAR CREDITS						**136**

I.3 THIRD YEAR

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AIES	3701	Botany of Economic Plants	7	02/28	28	8
AIES	3781	Population and Community Ecology	7	03/42	28	12
AIES	3791	Geo-informatics	7	03/42	28	12
AACA	3708	Field Attachment I	7	0	0	6
AIEE	3781	Eco-physiology	7	03/42	14	12
AIES	3721	Agroforestry	7	02/28	21	8
ACSC	3781	Research Methods I	7	03/42	21	12
TOTAL SEMESTER 1 CREDITS						**70**
Semester 2						
AIES	3782	Natural Res Policies, Laws & Conventions	7	03/42	14	12
AIES	3702	Community Based Resource Mgt	7	02/28	14	8
AIES	3722	Issues in Cons & Sustainable Dev	7	02/28	14	8
AASC	3711	Animal Anatomy and Physiology	7	04/56	21	16
ANRC	3792	Conservation Biology	7	03/42	21	12
ACSC	3782	Research Methods II	7	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**68**
TOTAL THIRD YEAR CREDITS						**138**

I.4 FOURTH YEAR

FORESTRY:

MODULE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AFOR	3810	Research Project (Forestry)	8	04/56	42	16
AFOR	3881	Principles of Silviculture	8	03/42	14	12
AFOR	3891	Forest Protection	8	03/42	14	12
AFOC	3881	Community Forestry	8	03/42	14	12
AFOF	3881	Forest Mensuration & Inventory	8	03/42	28	12
AACA	3808	Field Attachment II	8	0	0	6
TOTAL SEMESTER 1 CREDITS						**70**
Semester 2						
AFOR	3810	Research Project (Forestry)	8	04/56	42	16
AFOR	3812	Forest Economics & Marketing	8	04/56	28	16
AFOR	3832	Forest Harvesting	8	04/56	28	16
AGEC	3892	Entrepreneurship &Agric Bus Mgt	8	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**60**
TOTAL FOURTH YEAR CREDITS						**130**

WIDLIFE ECOLOGY AND MANAGEMENT

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AWLM	3810	Research Project (Wildlife Ecol & Mgt)	8	04/56	42	16
AWLM	3801	Animal Behaviour	8	02/28	28	8
AWLM	3811	Ornithology and Mammalogy	8	04/56	28	16
AWLM	3831	Rangeland Management	8	04/56	21	16
AACA	3808	Field Attachment II	8	0	0	6
AASC	3781	Animal Nutrition	7	03/42	21	8
TOTAL SEMESTER 1 CREDITS						**70**
Semester 2						
AWLM	3810	Research Project (Wildlife Ecol & Mgt)	8	04/56	42	16
AWLM	3882	Wildlife Diseases	8	03/42	21	12
AWLM	3892	Economics of Wildlife Resources	8	03/42	21	12
AWLW	3882	Wildlife Survey Techniques and Monitoring	8	03/42	14	12
AGEC	3892	Entrepreneurship &Agric Bus Mgt	8	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**64**
TOTAL FOURTH YEAR CREDITS						**134**

ENVIRONMENTAL SCIENCE

COURESE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AENV	3810	Research Project (Env Science)	8	04/56	42	16
AENV	3881	Environment and Development	8	03/42	28	12
AENV	3891	Environment Pollution Control	8	03/42	14	12
AENV	3801	Watershed Management	7	02/28	28	8
AACA	3808	Field Attachment II	8	0	0	6
AWLR	3831	Rangeland Management	8	04/56	28	16
TOTAL SEMESTER 1 CREDITS						**70**
Semester 2						
AENV	3810	Research Project (Env Science)	8	04/56	42	16
AENV	3882	Management of Arid and Semi-Arid Lands	8	03/42	28	12
AENV	3892	Resource Planning and Management	8	03/42	28	12
AENE	3882	Environmental Impact Assessment	8	03/42	28	12
AGEC	3892	Entrepreneurship &Agric Bus Mgt	8	03/42	21	12
TOTAL SEMESTER 2 CREDITS						**64**
TOTAL FOURTH YEAR CREDITS						**134**

I.5 MODULE DESCRIPTORS: Basic Science & University Core Modules

I.5.1 FIRST YEAR MODULES

I.5.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8

Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory. Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

I.5.1.2 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 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 on 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.

I.5.1.3 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16
Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

I.5.1.4 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title: **ENGLISH FOR ACADEMIC PURPOSES**
Code: ULEA 3419
NQF level: 4
Contact hours: 4 periods per week
Credits: 16
Module assessment: Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites: ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC
Module description (Content): This course 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.

I.5.1.5 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title: **INTRODUCTION TO BIOLOGY**
Code: SBLG 3411
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 domein system. Definitions and categories/groups within the five kingdoms, evolution by natural selection (microevolution vs macroevolution), phylogeny and evolutionary relationships in five kingdoms. The course content will also include genes, chromosomes, genomes, Mendelian genetics, extensions to Mendelian genetics, chromosome theory of inheritance, linkage and cross-over,

recombination, sex determination. The course content will also cover an introduction to Ecology: Definitions, history, scales in ecology, application of ecology. Conditions and Resources: Environmental conditions, animals and their resources, plants and their resources.

I.5.1.6 SBLG 3512: DIVERSITY OF LIFE

Module title:	**DIVERSITY OF LIFE**
Code:	SBLG 3512
Course Equivalent:	NSSC (/HIGH GRADE) Biology
NQF level:	5
Contact hours:	4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits:	16
Module assessment:	Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)
Prerequisites:	NSCC (Biology C or better)

Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.

Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field

I.5.1.7 SPHY 3401: PHYSICS FOR LIFE SCIENCES I

Module title:	**PHYSICS FOR LIFE SCIENCES I**
Code:	SPHY3401
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.

I.5.1.8 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title:	**PHYSICS FOR LIFE SCIENCES II**
Code:	SPHY 3412
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.

I.5.1.9 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, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence. The Binomial Theorem.

I.5.1.10 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.

I.5.1.11 SCHM 3412: CHEMISTRY FOR LIFE SCIENCES

Module Title: **CHEMISTRY FOR LIFE SCIENCES**
Code: SCHM3412
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.

I.5.1.12 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.

(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.)

I.6 MODULE DESCRIPTORS: B SC INTEGRATED ENVIRONMENTAL SCIENCE

I.6.1 SECOND YEAR MODULES

I.6.1.1 AIES 3601: ECOLOGY

Module Title: **ECOLOGY**
Code: AIES 3601
NQF level 6
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: None
Module description (Content):
Physical, chemical and biotic parameters; Community description, stability, diversity and patterns. Community dynamics. Ecosystems, energy flow, biomass, trophic levels and nutrient cycling. The concepts of autecology and synecology; classification of plant communities; biogeoclimatic classification (applied to Namibia), the concept of ecological succession and the various serial stages of plant communities. Keystone species

I.6.1.2 AIES 3621: PRINCIPLES OF WILDLIFE MANAGEMENT

Module Title: **PRINCIPLES OF WILDLIFE MANAGEMENT**
Code: AIES 3621
NQF level 6
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): (01 x 02 hour paper)
Prerequisites: None
Module description (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.

I.6.1.3 AIES 3641: ENVIRONMENTAL SCIENCE

Module Title: **ENVIRONMENTAL SCIENCE**
Code: AIES 3641
NQF level: 6
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least 2 assessments; Examination (60%): (01 x 02 hour paper)
Prerequisites: None
Module description (Content):
The concept of environment, natural resources, demography and land use. Major environmental concerns including pollution, soil degradation in crop and livestock production systems; effects of agrochemicals, desertification and methods of control, natural and human-made hazards, human population growth, industrialization, urbanization, energy sources, waste management and recycling.

I.6.1.4 AIES 3682: PLANT PHYSIOLOGY

Module Title: **PLANT PHYSIOLOGY**
Code: AIES 3682
NQF level 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least 3 assessments; Examination (60%): (01 x 03 hour paper)
Prerequisites: None
Module description (Content):
Plant water relations, diffusion and osmosis, drought tolerance, photosynthesis, C3, C4 and CAM plants, respiration, phloem transport, mineral nutrition, nitrogen fixation, plant growth and development, plant hormones and their adaptation to osmotic stress and herbivory.

I.6.1.5 AIES 3602: GENERAL SOIL SCIENCE

Module Title: **GENERAL SOIL SCIENCE**
Code: AIES 3602
NQF level 6
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: None
Module description (Content):
Concepts of soil, soil profile, soil type and structure: Soil formation factors and parent material; Soil texture, structure and consistency; Soil air, soil water and water movements, and their interactions with temperature, pH, soil organisms and soil organic matter; Basic soil/plant water relations; Major soil types and soil composition; Soil sampling techniques.

I.6.1.6 AIES 3622: CLIMATOLOGY AND HYDROLOGY

Module Title: **CLIMATOLOGY AND HYDROLOGY**
Code: AIES 3622
NQF level: 6
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments: Examination (60%) 01 x 02 hour paper
Prerequisites: None
Module description (Content):
This module 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. Topics covered include: Introduction to Climatology (concepts in climatology-weather, meteorology, climate, climatology, atmosphere; weather systems and weather forecasting-weather parameters, weather forecasting, world weather systems, Namibia weather conditions; climate-climatic data, climatic classifications, climatic zones of the world, climatic zones of Namibia). Hydrology (parameters and their measurement; hydrologic cycle (elements and their estimation; groundwater hydrology-aquifers, water table and aquifer recharge).

I.6.2 THIRD YEAR MODULES

I.6.2.1 AIES 3701: BOTANY OF ECONOMIC PLANTS

Module Title: **BOTANY OF ECONOMIC PLANTS**
Code: AIES 3701
NQF level: 7
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least 2 assessments; Examination (60%): (01 x 02 hour paper)
Prerequisites: None
Module description (Content):
Useful and toxic plants, their origin and history of plant use; Plant products and derivatives used in nutrition, medicine, industry and clothing; their chemical and structural nature; Potential for new crop species; Role of plants in historical and modern civilization; Utilization of indigenous vs exotics..

I.6.2.2 AIES 3781: POPULATION AND COMMUNITY ECOLOGY

Module Title: **POPULATION AND COMMUNITY ECOLOGY**
Code: AIES 3781
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment 40% (Minimum 2 tests, 1 assignment; 14 practicals); Examination: 60% (1 x 3 hour examination paper)
Prerequisites: None
Module description (Content):
Population analysis: Distributions, dispersal and migration. Estimating population numbers, life-tables analyses, survivorship, geometric and logistic population growth, density independent & density independent population regulation; competition, predation, herbivory, Habitat utilization

I.6.2.3 AIEE 3781: ECO-PHYSIOLOGY

Module Title: **ECO-PHYSIOLOGY**
Code: AIEE 3781
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites AIES 3682 Plant Physiology
Module description (Content):
Physical, chemical, biotic factors affecting organism growth and survival; physiological functions and adjustments underlining ecological observations from the viewpoint of growth, reproduction, survival, abundance and distribution. Effects of photosynthesis, respiration, transport of photosynthetic products, water economy, energy economy, nutrient economy, growth and carbon allocation; stress physiology, connection between structure and function and effects of environmental changes;

I.6.2.4 AIEG 3791: GEO-INFORMATICS

Module Title: **GEO-INFORMATICS**
Code: AIEG 3791
NQF level: 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (content): Traditional survey methods; Linear and angular measurements; triangulation, traversing, mapping by plane tabling and chain surveys, profile and differential leveling, contours and contouring; Preparation of plans and maps, area and volume computations; Characteristics of photographic images; stereo viewing and construction of aerial mosaics. The concept and principles of remote sensing. The electromagnetic spectrum; types of sensors and plate forms. Principles of air-photo interpretation, satellite remote sensing and its application to natural resource mapping,

meteorology, natural hazards detection and environmental degradation detection and monitoring. Digital image processing; Review of different types of geographic information and their use in GIS; Cartographic and data base procedures – spatial data structures, topography and analytical procedures. Database design.

I.6.2.5 ACSC 3791: RESEARCH METHODS I

Module Title: **RESEARCH METHODS I**
Code: ACSC 3791
NQF level: 07
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
Statistical packages, scientific research, objectives of experiments, principles of experimental design and experimental designs, Topics covered include: Analysis of Variance, standard experimental designs, factorial experiments, linear regression and correlation, transformations, non-parametric statistical techniques, mean comparisons. Procedures for implementing research project and presentation of research results. In addition, probability, Bayes' theorem, combinations and permutations, binomial, Poisson, T and normal distributions are reviewed.

I.6.2.6 AACA 3708: FIELD ATTACHMENT I

Module Title: **FIELD ATTACHMENT I**
Code: AACA 3708
NQF level: 7
Contact hours: 6 weeks
Credits: 6
Module Assessment: 50 % Report presentation at a seminar**;** 50 % Written report
Prerequisites: None
Module description (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. An attachment report and oral presentation will constitute the total assessment mark.

I.6.2.7 AIES 3721: AGROFORESTRY

Module Title: **AGROFORESTRY**
Code: AIES 3721
NQF level 7
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: AIES 3601 Ecology I
Module description (Content):
Introduction to agroforestry: definition and principles of agroforestry, integrated land-use system, need for agroforestry, agroforestry and people, causes and consequences of deforestation. Land-use systems and possible agroforestry intervention. Multi-purpose tree species and their uses. Agroforestry systems. Agroforestry establishment techniques. Ecological and economic interactions. Bee keeping. Indigenous fruit trees. .

I.6.2.8 AIES 3782: NATURAL RESOURCES POLICIES, LAWS AND CONVENTIONS

Module Title: **NATURAL RESOURCES POLICIES, LAWS AND CONVENTIONS**
Code AIES 3782
NQF level 7
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (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.

I.6.2.9 AIES 3702: COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT

Module Title: **COMMUNITY-BASED NATURAL RESOURCE MANAGEMENT**
Code: AIES 3702
NQF level 7
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: AIES 3621 Principles of Wildlife Management
Module description (Content):
Rural development and livelihoods: concepts and principles. Principles of devolution, proprietorship, incentives, authority and responsibility over natural resources. Rural livelihood strategies. Local institutions (conservancies) for CBNRM. Governance, participation and communication. Community capacity building. Natural resource monitoring and adaptive utilization. Enterprise development and benefit sharing. Conflict management. Case studies: wildlife, environment and forestry.

I.6.2.10 AIES 3722: ISSUES IN CONSERVATION AND SUSTAINABLE DEVELOPMENT

Module Title: **ISSUES IN CONSERVATION AND SUSTAINABLE DEVELOPMENT**
Code: AIES 3722
NQF level 7
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: AIES 3621: Principles of Wildlife Management
Module description (Content):
Principles of sustainable development. Conservation and Sustainable Development Concepts; Cost-Benefit Analysis and Environmental conservation; Social Issues, Policies and Processes: Population; ethics and religion; conflict management and land disputes; Political Ecology; Participatory approaches. Sustainable Agriculture and Forestry: trade, development and the Environment, and pesticide use. Sustainable Conservation of Biological Diversity: Introduced species: cultural ecology; indigenous knowledge in the conservation of biodiversity, international treaties with regard to biodiversity, conservation of single species versus ecosystem conservation.

I.6.2.11 ACSC 3782: RESEARCH METHODS II

Module Title: **RESEARCH METHODS II**
Code: ACSC 3782
NQF level: 07
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: ACSC 3782: RESEARCH METHODS I
Module description (Content):
Introduction / review of basic statistical methods; Comparison between non-parametric and parametric statistics. Non-parametric statistics (Goodness of fit tests; tests of association, Chi Square tests; paired comparisons, Wilcoxon's tests; rank correlation); regression and correlation; Multivariate methods (multiple regression, discriminant analysis, canonical analysis, multidimensional scaling, principal component analysis). Introduction to Statistical Computer packages.

I.6.3 FOURTH YEAR MODULES

I.6.3.1 FORESTRY

I.6.3.1.1 AFOR 3810: RESEARCH PROJECT (FORESTRY)

Module Title: **RESEARCH PROJECT (FORESTRY)**
Code: AFOR 3810
NQF level: 8
Contact hours: Individual student consultation for 28 weeks: equivalent to 1 hour a week.
Credits: 32
Module Assessment: 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.
Prerequisites: ACSC 3781: Research Methods I and ACSC 3782: Research Methods II
Module description (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.

I.6.3.1.2 AFOR 3881: PRINCIPLES OF SILVICULTURE

Module Title: **PRINCIPLES OF SILVICULTURE**
Code: AFOR 3881
NQF level 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
Definitions and relations with other disciplines. The ecosystem concept in a forestry context, ecological succession and its influences on silvicultural practice and systems. The effects of the physical environment on tree growth; the ecophysiology of tree growth. Flowering physiology, periodicity. Seed physiology including dormancy, seed collection, processing, storage and transport. Vegetation propagation. Nursery design, layout and practice. Silviculture systems.

I.6.3.1.3 AFOR 3891: FOREST PROTECTION

Module Title: **FOREST PROTECTION**
Code: AFOR 3891
NQF level 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None

Module description (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.

I.6.3.1.4 AFOC 3881: COMMUNITY FORESTRY

Module Title: **COMMUNITY FORESTRY**
Code: AFOC 3881
NQF level 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
History, definition and approaches; Interlinkages with other sectors. Aims and objectives of community forestry. Policy and strategies relevant to community forestry. Technical and management alternatives to integrated forest management. Case studies of community forestry.

I.6.3.1.5 AFOF 3881: FOREST MENSURATION AND INVENTORY

Module Title: **FOREST MENSURATION AND INVENTORY**
Code: AFOF 3881
NQF level 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least TWO assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: None
Module description (Content): Introduction to forest mensuration: Mensuration systems, concepts and models of forest mensuration. Tree Measurements and Instruments; Tree characteristics; age, diameter and basal area, height, bark thickness, volume, mass, growth. Standard measurements: Stocking, basal area, stand volume, biomass, mean diameter distribution, mean height and dominant height, increment (CAI and MAI), relascope and ocular estimates. Forest Inventories; Inventory methods: compartment inventories, sampling, national forest inventory, precision/statistics. Inventories by circular sample plots; fieldwork, calculations, reporting. Introduction to Growth and Yield Modeling Trees.

I.6.3.1.6 AACA 3808: FIELD ATTACHMENT II

Module title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF level: 8
Contact hours: Six weeks of Field Attachment
Credits: 6
Module assessment: 40% (Field Attachment Seminar Presentations) 60% (Field attachment Reports)
Prerequisites: IES 3708: Field Attachment
Module description (Content):
At the end of the Third Year students will be attached to selected institutions or hands on experience. An attachment report and an oral presentation constitute the total assessment mark.

I.6.3.1.7 AFOR 3812: FOREST ECONOMICS AND MARKETING

Module Title: **FOREST ECONOMICS AND MARKETING**
Code: AFOR 3812
NQF level 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
Forest economic concepts, economics of resource conservation. Methods of input costing – private versus social costs and private versus social benefits. Depreciation methods and determination of maintenance costs. Resource accounting procedures. Maximum sustainable yield and maximum economic yield. Work-study procedures. Principles of shadow pricing, economies and diseconomies of scale in forestry operations. Accounting techniques in forestry. Principles of marketing, market research and promotion.

I.6.3.1.8 AFOR 3832: FOREST HARVESTING

Module Title: **FOREST HARVESTING**
Code: AFOR 3832
NQF level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
Definition and scope. Forest organization, the principles of sustained yield and normal forest. Yield regulation, estimation of allowable cuts, rotation. Felling plants and programme of work. Planning of logging operations, low-impact harvesting systems, integrated harvesting concepts and practices, harvesting systems analysis, logging production cost control. Stump area operations, terrain transport, terminal and underway operations. Transportation systems, forest roads, their design and maintenance. Ergonomics and work safety.

I.6.3.2 WILDLIFE ECOLOGY AND MANAGEMENT

I.6.3.2.1 AWLM 3810: RESEARCH PROJECT (WILDLIFE ECOL & MGT)

Module Title: **RESEARCH PROJECT (WILDLIFE ECOL & MGT)**
Code: AWLM 3810
NQF level: 8
Contact hours: Individual student consultation for 28 weeks: equivalent to 1 hour a week.
Credits: 32
Module Assessment: 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.
Prerequisites: ACSC 3781: Research Methods I and CSC 3782: Research Methods II
Module description (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.

I.6.3.2.2 AWLM 3801: ANIMAL BEHAVIOUR

Module Title: **ANIMAL BEHAVIOUR**
Code: AWLM 3801
NQF level: 8
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
redits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: None
Module description (Content):
Simple and complex behaviour. Sign-stimuli, motivation. Conflict behaviour, orientation, learning, genes and behaviour. Feeding behaviour; Social and non-social behaviour; Aggression; Sexual behaviour, Effects of environment on breeding. Primate and Carnivore behaviour.

I.6.3.2.3 AWLM 3811: ORNITHOLOGY AND MAMMALOGY

Module title: **ORNITHOLOGY AND MAMMALOGY**
Code: AWLM 3811
NQF level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
Classification and phylogeny of mammals and birds; identification, anatomy, physiology, With emphasis on endangered species. Biogeography. Reproductive ecology; comparative anatomy and physiology. Natural and human threats to habitats of mammal and bird populations; Conservation strategies.

I.6.3.2.4 AWLM 3831: RANGELAND MANAGEMENT

Module Title: **RANGELAND MANAGEMENT**
Code: AWLW 3831
NQF level: 8
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
The role of pasture and range in Namibia; Rangeland ecology, range succession and retrogression, climax vegetation; Taxonomy, nomenclature and morphology of common range plants; Principles and practices of range management; Range evaluation and monitoring devices; Telemetry and Capture anaesthesia; Inter-relationships between plant species, the grazing animal and grazing management systems. Control of poisonous plants; Establishment, management and utilization of cultivated pastures and fodders; Conservation of forage; Seeds and seed production.

I.6.3.2.5 AACA 3808: FIELD ATTACHMENT II

Module title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF level: 8
Contact hours: Six weeks of Field Attachment
Credits: 6
Module assessment: 40% (Field Attachment Seminar Presentations) 60% (Field attachment Reports)
Prerequisites: AACA 3708: Field Attachment I

Module description (Content):
At the end of the Third Year students will be attached to selected institutions or hands on experience. An attachment report and an oral presentation constitute the total assessment mark.

I.6.3.2.6 AWLM 3882: WILDLIFE DISEASES

Module: **WILDLIFE DISEASES**
Module Code: AWLM 3882
NQF Level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module Description (Content):
Recent advances in immunology; major infectious diseases of captive and free-living wild animals (plagues, pathology, diagnosis, treatment and control); miscellaneous infectious and non-infectious diseases, reproductive disorders, neurodegenerative diseases; nutritional diseases; wildlife disease investigation; preventive medicine; physical and chemical restraint and anesthesia. Aspects of mammalian, avian and reptilian surgery.

I.6.3.2.7 AWLM 3892: ECONOMICS OF WILDLIFE RESOURCES

Module: **ECONOMICS OF WILDLIFE RESOURCES**
Module Code: AWLM 3892
NQF Level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module Description (Content):
Typology of natural resources; exploitation rates of renewable resources with emphasis on wildlife cropping; The concept of common property and free access resources; wildlife on private and public land. The economics 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 species, e.g. tourist attractions, anesthetics, venison, aphrodisiac, etc.; future potential uses of wildlife.

I.6.3.2.8 AWLW 3882: WILDLIFE SURVEY TECHNIQUES AND MONITORING

Module: **WILDLIFE SURVEY TECHNIQUES AND MONITORING**
Module Code: AWLW 3882
NQF Level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module Description (Content):
The purpose of surveying. Sampling techniques: strip surveys, aerial surveys, waterhole counts, spoor counts. Reliability of survey results and sources of errors. Planning, analysis and cost of counting. Veldt management, and game farming. Game utilization.

I.6.3.3 ENVIRONMENTAL SCIENCE

I.5.3.3.1 AENV 3810: RESEARCH PROJECT (ENV SCIENCE)

Module Title: **RESEARCH PROJECT (ENV SCIENCE)**
Code: AENV 3810
NQF level: 8
Contact hours: Individual student consultation for 28 weeks: equivalent to 1 hour a week.
Credits: 32
Module Assessment: 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.
Prerequisites: ACSC 3781: Research Methods I and ACSC 3782: Research Methods II
Module description (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.

I.6.3.3.2 AENV 3881: ENVIRONMENT AND DEVELOPMENT

Module: **ENVIRONMENT AND DEVELOPMENT**
Module Code: AENV 3881
NQF Level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module Description (Content):
Links between environment and development; International principles and approaches; Triple bottom line: ecological, social and financial effects of development. International events: Rio, Rio + 10, CSD; international treaties: BDC, CCD, CCC etc. National approaches and tools for sustainable development: EIA, state of the Environment Reporting, National Strategy.

I.6.3.3.3 AENV 3891: ENVIRONMENTAL POLLUTION AND CONTROL

Module title: **ENVIRONMENTAL POLLUTION AND CONTROL**
Code: AENV 3891
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (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).

I.6.3.3.4 AENV 3801: WATERSHED MANAGEMENT

Module Title: **WATERSHED MANAGEMENT**
Code: AENV 3801
NQF level: 7
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module Assessment: Continuous assessment (40%): at least two assessments; Examination (60%): 01 x 02 hour examination paper
Prerequisites: None
Module description (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. Perennial and ephemeral rivers. Watershed analysis including techniques, collection of field data and sources of information. Underground water sources and their management in Namibia. Water harvesting.

I.6.3.3.5 AACA 3808: FIELD ATTACHMENT II

Module title: **FIELD ATTACHMENT II**
Code: AACA 3808
NQF level: 8
Contact hours: Six weeks of Field Attachment
Credits: 6
Module assessment: 40% (Field Attachment Seminar Presentations) 60% (Field attachment Reports)
Prerequisites: AACA 3708: Field Attachment I
Module description (Content):
At the end of the Third Year students will be attached to selected institutions or hands on experience. An attachment report and an oral presentation constitute the total assessment mark.

I.6.3.3.6 AENV 3892: MANAGEMENT OF ARID AND SEMI-ARID LANDS

Module Title: **MANAGEMENT OF ARID AND SEMI-ARID LANDS**
Code: AENV 3892
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Prerequisites: None
Module description (Content):
Characteristics of arid and semi-arid lands, hydrology, agrometeorology and water resource and utilization; Water harvesting for agricultural development. Land use practices; Desertification and land degradation in marginal lands; Traditional land use practices and prevention of land degradation. Biodiversity conservation, reclamation and sustainable economic exploitation of arid and semi-arid lands.

I.6.3.3.7 AENR 3892: RESOURCE PLANNING AND MANAGEMENT

Module Title: **RESOURCE PLANNING AND MANAGEMENT**
Code: AENR 3892
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 12
Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Pre-requisites: None
Module description (Content) :
Theory in planning and theory of current theories of planning and their relevant application; planning tools and process; resource survey and analysis; methods of assessing a resource base and its socio-economic relations; physical, human and institutional resources; techniques of survey, analysis and classification of physical resources.

I.6.3.3.8 AENE 3882 : ENVIRONMENTAL IMPACT ASSESSMENT

Module Title: **ENVIRONMENTAL IMPACT ASSESSMENT**
Code: AENE 3882
NQF level: 8
Contact hours: Lectures: 3x 1hr L/wk for 14 weeks (42hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)

Module Assessment: Continuous assessment (40%): at least three assessments; Examination (60%): 01 x 03 hour examination paper
Pre-requisites: None
Module description (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.

J. BACHELOR OF VETERINARY MEDICINE (PRE-CLINICAL STUDIES / PRE-VET) ({New Programme})

J. 1 ADMISSION

J.1.1 To register for Bachelor of Veterinary Medicine (Pre-Clinical Studies / Pre-Vet) Programme (BVM) a candidate must hold a valid Namibian Senior Secondary Certificate (NSSC) ordinary or higher or recognized equivalent qualification with a minimum of 25 points from five subjects on the UNAM Evaluation Point Scale.

J.1.2 English is a compulsory subject and should normally have been obtained at NSSC (Ordinary Level) with a minimum "C" symbol or equivalent.

J.1.3 In addition to the above, admission to BVM programme requires a "B" symbol pass in Biology, and at least a "C" symbol pass in Mathematics and Physical Science.

J.1.4 Notwithstanding the above, candidates with a three-year Diploma in Agriculture or related field with a combined average pass of 70% (i.e. pass with merit) or higher, from a recognized and accredited institution, shall be granted admission to the First Year of the BVM programme.

J.1.5 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.

J.1.6 The Faculty reserves the right to interview candidates before admission.

J.2 DURATION OF STUDY

J.2.1 The BVM pre-clinical studies is a fixed two-year programme, but maybe completed within a maximum period of three years. Students who are unable to complete the programme within the stipulated period of three years, as indicated above, shall be discontinued from the programme. Such students may be allowed to continue with other B. Sc. degree programmes within Faculty of Agriculture & Natural Resources (FANR) or Faculty of Science.

J.3 EXAMINATION REGULATIONS

J.3.1 For detailed examination and promotion regulations, please refer to the General Information and Regulations Prospectus of the University of Namibia.

J.4. ACADEMIC ADVANCEMENT REGULATIONS

Promotion from First to Second Year

J.4.1 A student must pass at least 85%, or equivalent of 143 out of 168 credits, of the prescribed first year curriculum (i.e. a pass rate of 11 out of 13 modules) in order to qualify for promotion to year two. In addition to the above, a student must pass both Biology modules (i.e. BLG 3411: Introduction to Biology, and BLG 3512: Diversity of Life) to be able to proceed to the second year since these two modules are pre-requisites for all second year modules. No student will be allowed to proceed to second year if any one or both of these modules are not passed in the first year.

J.4.2 Candidates who do not meet the BVM programme admission requirements but who may have successfully completed similar first year modules in a different Faculty may, at the discretion of FANR, be admitted into the second year of the BVM programme provided that they have scored at least 60% pass in Introduction to Biology (BLG 3411), Diversity of Life (BLG 3512), Basic Mathematics (MAT 3511), Pre-Calculus (MAT 3512), Physics for Life Science I (PHY 3401), Physics for Life Science II (PHY 3412), Chemistry 1A (CHM3411) and Chemistry 1B (CHM3512).

Promotion from Second to Third Year

J.4.3 A student in the second year must pass all prescribed modules in the curriculum in order to qualify for transfer to the partner / foster universities. No student will be retained in the programme beyond the maximum period of three years.

J.5 REPEAT AND DISCONTINUATION

J.5.1 A student who has failed more than two modules of the first year curriculum will be allowed to repeat the year. A student who fails more than three modules of the first year curriculum shall be discontinued from the programme. A student may be allowed to re-register for the failed year after a mandatory two-year break.

J.6 PROGRAMME SCHEDULE

BACHELOR OF VETERINARY MEDICINE (PRE-CLINICAL STUDIES / PRE-VET)

J.6.1 FIRST YEAR

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.

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
UCLC	3409	Computer Literacy	4	02/28	21	8
ULCE	3419	English Communication and Study Skills	4	04/56	0	16
UCSI	3429	Contemporary Social Issues	4	02/28	0	8
SBLG	3411	Introduction to Biology	4	04/56	42	16
SPHY	3401	Physics for Life Sciences I	4	02/28	21	8
SMAT	3511	Basic Mathematics	5	04/56	0	16
SCHM	3411	Chemistry 1A	4	04/56	42	16
TOTAL SEMESTER 1 CREDITS						**80**
Semester 2						
ULEA	3419	English for Academic Purposes	4	04/56	0	16
SCHM	3512	Chemistry 1B	5	04/56	42	16
SPHY	3412	Physics for Life Science II	4	04/56	42	16
SBLG	3512	Diversity of Life	5	04/56	42	16
SMAT	3512	Pre-calculus	5	04/56	0	16
SSTS	3422	Introduction to Statistics	4	02/28	0	8
TOTAL SEMESTRER 2 CREDITS						**88**
TOTAL FIRST YEAR CREDITS						**168**

J.6.2 SECOND YEAR

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AASC	3611	Basic Veterinary Microbiology	6	04/56	42	16
AASC	3601	Genetics	6	02/28	21	8
AASC	3631	Gross Animal Anatomy I	6	04/56	42	16
AASC	3651	Animal Production	6	04/56	42	16
AASC	3671	Veterinary Physiology I	6	04/56	42	16
TOTAL SEMESTER 1 CREDITS						**72**
Semester 2						
AASC	3612	Biochemistry	6	04/56	42	16
AASC	3632	Gross Animal Anatomy II	6	04/56	42	16
AASC	3652	Veterinary Physiology II	6	04/56	42	16
AASC	3672	Veterinary Histology	6	04/56	42	16
AANS	3612	Veterinary Embryology	6	04/56	42	16
TOTAL SEMESTER 2 CREDITS						**80**
TOTAL SECOND YEAR CREDITS						**152**

J.7 MODULE DESCRIPTORS: Basic Science & University Core Modules

J.7.1 FIRST YEAR MODULES

J.7.1.1 UCLC 3409: COMPUTER LITERACY

Module title: **COMPUTER LITERACY**
Code: UCLC 3409
NQF level: 4
Contact hours: 2 periods per week for 14 weeks
Credits: 8
Module assessment: Continuous Assessment 100%: Contribution to final Mark: 2 Practical Tests 50%; 2 Theory Tests 50%
Prerequisites: None
Module description (Content):
The aim of this module is to equip the student through hands-on experience with the necessary skills to use applications software such as Word processing, Spreadsheets, Database, Presentations and communications packages for increasing their productivity in an education and training environment.

J.7.1.2 ULCE 3419: ENGLISH COMMUNICATION AND STUDY SKILLS

Module title: **ENGLISH COMMUNICATION AND STUDY SKILLS**
Code: ULCE 3419
NQF Level: 4
Contact hours: 4 hours per week for 14 weeks
Credits: 16

Module Assessment: Continuous assessment (60%): 2 tests (reading and writing) 2 reading assignments 1 oral presentation Examination (40%):1 x 3 hour examination paper
Pre-requisites: None
Module description (Content):
This module is aimed at assisting students in the development of their reading, writing and speaking and listening skills, in order to cope with studying in a new academic environment and in a language which may not be their first language. The module also focuses on study skills that students need throughout their academic careers and beyond. The module serves as an introduction to university level academics, where styles of teaching and learning differ from those at secondary schools in that more responsibility is placed on the student. The module therefore, focuses on the skills that students need throughout their academic careers and beyond.

J.7.1.3 UCSI 3429: CONTEMPORARY SOCIAL ISSUES

Module Title: **CONTEMPORARY SOCIAL ISSUES**
Code: UCSI 3429
NQF: 4
Contact Hours: 2 Contact hours per week for 14 weeks
Credits: 8
Module Assessment: Continuous assessment (50%): test or assignment; Examination (50%): 1x2 hours paper
Prerequisite: None
Module Description (Content):
The module raises awareness on the need for a personal, national and global ethics. The main objectives of the course 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 orientates students with regards to the epidemiology of HIV/AIDS; the prevalence of the disease on 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.

J.7.1.4 SBLG 3411: INTRODUCTION TO BIOLOGY

Module title: **INTRODUCTION TO BIOLOGY**
Code: SBLG 3411
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), Examination (60%): 3 hour examination paper.
Prerequisites: NSCC (Biology C or better)
Module description: 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 the 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 and ecosystems.

J.7.1.5 SPHY 3401: PHYSICS FOR LIFE SCIENCE I

Module title: **PHYSICS FOR LIFE SCIENCES I**
Code: SPHY3401
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: IGCSE Physical Science
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 unit conversion, SI system and significant figures; Motion in one dimension, average velocity, acceleration, motion at constant 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 in two dimensions; Projectiles in one and two dimensions; Force and weight, Newton's first, second and third laws, applications of Newton's laws, 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 first, second and third laws; 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.

J.7.1.6 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
Assessment: Continuous assessment 50% (at least 2 tests), examination 50% (3 hours examination paper).
Prerequisite: IGCSE mathematics or special remedial course
Module description:
Sets: notations and diagrams to represent sets, subset, empty set, equality of sets, intersection, union, complement. Algebraic expressions: simplification, expansion, polynomials, reminder and factor theorem, partial fractions. Trigonometry: trigonometric functions, basic trigonometric identities. The absolute value, linear equations, linear inequalities, quadratic equations, the quadratic formula, quadratic inequalities. Functions: domain, codomain, image, preimage, even function, odd function. Sequences: the general term, the geometric sequence, the arithmetic sequence, The Binomial Theorem.

J.7.1.7 SCHM 3411: CHEMISTRY IA

Module Title: **CHEMISTRY 1A**
Code: CHM3411
NQF Level: 4
Contact Hours: 56 hours of lectures, 42 hours of practical sessions.
Credits: 16
Module Assessment: CA: 50% (minimum 3 tests accounting for 75 %, laboratory accounting for 15 % of the CA, tutorial assignments 10%). Final Exam: 50%; (1 x 3 hour exam paper)

Prerequisites: Faculty Entry Requirements

Module Description:
This module is a brief introduction to general chemistry and it lays the foundation of basic facts necessary for further studies in chemistry. The following topics are covered:

Content:
An Introduction To Chemistry: Classification of Matter; The Three States of Matter; Physical and Chemical Properties of Matter; Measurement; Handling Numbers (scientific notation, significant figures); Factor-Label Method in Solving Problems. Atoms, Molecules and Ions: The Structure of the Atom; Atomic Number, Mass Number, and Isotopes; Molecules and Ions; Chemical Formulas (molecular and empirical); Naming Compounds. Mass Relationships in Chemical Reactions: Atomic Mass; Avogadro's Number and Molar mass; Molecular Mass; Percent Composition of Compounds; Experimental Determination of Empirical Formulas; Chemical Reactions and Chemical Equations; Stoichiometry (amounts of reactants and products); Limiting & Excess Reagents; Reaction Yield; Concentration of Solutions. Reactions in Aqueous Solutions: General Properties of Aqueous Solutions; Precipitation Reactions; Acid-Base Reactions; Oxidation and Reduction Reactions (assigning oxidation states, writing redox equations, balancing redox reactions). Quantum Theory and the Electronic Structure of Atoms: The Photoelectric Effect; Bohr's Theory of the Hydrogen Atom; Quantum Numbers; Atomic Orbitals; Electron Configuration; The Building-up Principle. Periodic Relationships Among Elements: Periodic Classification of the Elements; Periodic Variation in Physical Properties (effective nuclear charge, atomic radius, ionic radius); Ionization Energy; Electron Affinity; Variation in Chemical Properties of the Representative Elements (main group elements). Chemical Bonding: Lewis Dot Symbols; Ionic Bonding; Covalent Bonding; Metallic Bonding; Electronegativity; Writing Lewis Structures; Formal Charge; Concept of Resonance; Bond Enthalpy. Basic Molecular Geometry and Hybridization of Atomic Orbitals: Molecular Geometry; Dipole Moments; Valence Bond Theory; Hybridization of Atomic Orbitals; Molecular Orbital Theory; Molecular Orbital Configurations.

J.7.1.8 ULEA 3419: ENGLISH FOR ACADEMIC PURPOSES

Module title: **ENGLISH FOR ACADEMIC PURPOSES**
Code: ULEA 3419
NQF level: ` 4
Contact hours: 4 periods per week
Credits: 16
Module assessment: Continuous assessment: 60%. Two graded assessments in reading and writing skills. One graded assessment based on a referenced academic essay. One graded assessment of presentation skills. Examination: 40%: 1x 2 hour paper.
Pre-requisites: ULCE 3419: English Communication and Study Skills or B in English at NSSC or 4 in English at HIGHER GRADE NSSC
Module description (Content): This course 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.

J.7.1.9 SCHM 3512: CHEMISTRY 1B

Module Title: **CHEMISTRY 1B**
Code: CHM3512
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)
Prerequisites: Faculty Entry Requirements

Module Description:
This module is a continuation of Chemistry 1A and it introduces the students to properties of gases, thermochemistry, chemical kinetics, chemical equilibrium, Introduction to laws of thermodynamics, electrochemistry and organic chemistry. The following topics are covered:

Content:
Gases: Pressure of a Gas; The Gas Laws; The Ideal Gas Equation; Gas Stoichiometry; The Kinetic-Molecular Theory of Gases; Deviation from Ideal Behaviour. Basic Thermochemistry: The Nature of Energy and Types of Energy; Energy Changes in Chemical Reactions; Introduction to Thermodynamics; Enthalpy of Chemical Reactions; Calorimetry; Standard Enthalpy of Formation and Reaction; Heat of Solution and Dilution. Introductory Chemical Kinetics: Rate of Reaction; Rate Law; Relation between Reactant Concentration and Time; Activation Energy and Temperature Dependence of Rate Constants; Reaction Mechanisms; Catalysis. Introduction to Chemical Equilibrium: The Equilibrium Constant; Writing Equilibrium Constant Expressions; Relationship between Chemical Kinetics and Chemical Equilibrium; What Does the Equilibrium Constant tell Us? Factors that Affect Chemical Equilibrium. Acid-Base Equilibria & Solubilty Equilibria: The Common Ion Effect; Buffer Solution; Acid – Base Titrations; Acid-Base Indicators; Solubility Equilibria; Separation of Ions by Fractional Precipitation; The Common Effect and Solubility; pH and Solubility; Complex Ion Equilibria and Solubility. Entropy, Free Energy and Equilibrium: The Three Laws of Thermodynamics; Spontaneous Processes; Entropy; The Second Law of Thermodynamics; Gibbs Free Energy; Free Energy and Chemical Equilibrium; Thermodynamics in Living Systems. Introduction to Electrochemistry: Galvanic Cells; Standard Reduction Potentials; Spontaneity of Redox Reactions; Effect of Concentration of Cell EMF; Electrolysis. Introduction to Organic Chemistry: Classes of Organic Compounds; Structure and Nomenclature Main Functional Groups (alkanes, alkenes, alkynes, alcohols, aldehydes, ketones, carboxylic acids, esters, amines, amides). Introduction to carbohydrates, lipids and porphyrins.

J.7.1.10 SPHY 3412: PHYSICS FOR LIFE SCIENCES II

Module Title: **PHYSICS FOR LIFE SCIENCES II**
Code: PHY 3412
NQF Level: 4
National Professional: None
Standard Competencies: None
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-requisite(s): IGCSE Physical Science
Module description (contents) :
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.

J.7.1.11 SBLG 3512: DIVERSITY OF LIFE

Module title: **DIVERSITY OF LIFE**
Code: BLG 3512
Course Equivalent: NSSC (/HIGH GRADE) Biology
NQF level: 5
Contact hours: 4 lecture periods / week for 14 weeks and one three hour practical session per week
Credits: 16
Module assessment: Continuous assessment: Theory (not less than 3 tests and 2 Assignments) 40% Practicals (not less that 10 marked assignments) 50% Examination: 60% (1 x 2 hour examination paper)

Prerequisites: NSCC (Biology C or better)
Module 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, Chodrichthyes, Actinopterygii, Actinistia, Dipnoi, Amphibia, Reptilia, Aves, Mammalia) bryophytes, seedless vascular plants, gymnosperms, and the angiosperms. Concepts such as Homology and analogy; body symmetry (radial, bilateral), cephalisation, body cavities: diploblastic, triploblastic (acoelomate and coelomate [deuterostomes and protostomes]) will be covered.
Examples from Namibia shall be used where possible and applicable. The course content shall be supplemented with appropriate weekly practical sessions in the laboratory and in the field.

J.7.1.12 SMAT 3512: PRECALCULUS

Module name: **PRECALCULUS**
Code: MAT 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 2 tests), examination 50% (3 hours examination paper).
Prerequisite: IGCSE mathematics

Module description:
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.

J.7.1.13 SSTS 3422: INTRODUCTION TO STATISTICS

Module Title: **INTRODUCTION TO STATISTICS**
Code: **STS 3422**
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.

(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.)

J.8 MODULE DESCRIPTORS: BACHELOR OF VETERINARY MEDICINE (PRE-CLINICAL STUDIES / PRE-VET)

J.8.1 SECOND YEAR MODULES

J.8.1.1 AASC 3611: BASIC VETERINARY MICROBIOLOGY

Module Title: **BASIC VETERINARY MICROBIOLOGY**
Code: AASC 3611
NQF Level: 6
Contact Hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 6
Module Assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1 x 3 hr paper)
Prerequisites: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module Description (Content):
This course has been developed in order to provide theoretical and practical information on all aspects of microbiology. It will provide a student with a general overview of microbiology and lead to correct diagnosis and provision of proper management of diseases of domestic and wild animals; also management and control of diseases of public health importance, and ability to perform laboratory diagnostic tests with minimal facility. The importance of microorganisms in human and animal health, as well as their applications in industry and their impact on ecology will be studied. The course will encompass bacteriology, mycology, virology and protozoology, emphasizing microbes important in animal health and zoonoses. Classification of different microorganisms. Morphological and physiological differences between Bacteria, rickettsiae, mycoplasma, fungi, viruses and protozoa. Disinfection and sterilization. Antimicrobial chemotherapy, its judicial use and its application in the control of microorganisms in animal tissues and environment. Collection and transportation of clinical specimens. Basic laboratory diagnostic and techniques. Culture, isolation and identification of selected bacteria. Gram Staining, Ziehl-Nielsen staining, spore stain, biochemical tests, microscopy, aseptic techniques, culture media. laboratory safety.

J.8.1.2 AASC 3601: GENETICS

Module title: **GENETICS**
Code: AASC 3601
NQF level: 6
Contact hours: Lectures: 2x 1hr L/wk for 14 weeks (28hrs); Practicals: 1 x 3hr Prac alternate wk for 14 weeks (21hrs)
Credits: 8
Module assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 5x marked practicals). Exam: 60% (1 x 2 hr paper)
Prerequisites: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description (content): This course introduces and presents principles and methods used in the study of genetics. Students learn about the transmission, distribution, arrangement, and alteration of genetic information. The emphasis throughout is on application of concepts to solve problems. The course enables an improved understanding of current genetics topics and their influence on modern animal biotechnology, and it provides a foundation for more advanced studies in veterinary medicine and related fields. The specific topics to be covered will be:

Structure and Biochemistry of DNA: DNA - the Genetic Code, Structure, Replication, and Manipulation of DNA , Transcription and Translation.
Transmission Genetics: Basic and advanced principles of heredity, the chromosomal basis of heredity, linkage, mapping, and chromosomes, gene linkage and genetic mapping, karyotypes, eukaryotes and chromosome behavior.
Prokaryotic Genetics: The genetics of bacteria and viruses, molecular mechanisms of prokaryotic and eukaryotic gene regulation.
Specialized Topics: Introduction to genetic engineering and genomics, mechanisms of mutation, cancer, the basics of population genetics (Hardy-Weinberg Law).

J.8.1.3 AASC 3631: GROSS ANIMAL ANATOMY I

MODULE TITLE: **GROSS ANIMAL ANATOMY I**
Code: AASC 3631
NQF Level: 6
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals).Exam: 60% (1 x 3 hr paper)
Prerequisite: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description: This module intends to provide the student with a foundation of theoretical and practical general anatomy with special reference to mammalian anatomy as a preparation for other subsequent modules. It covers the following topics:
Principles of Gross Anatomy: Terminology, directional planes, organization of mammalian body into systems;
Locomotor System: Axial and appendicular skeletons. Forelimb – bones, joints, muscles, ligaments and movements. Hind limb – bones, joints, muscles, ligaments and movements. Axial skeleton, muscles, movements.
Cardiovascular System: Principles of circulatory systems. The heart – position in thorax, exterior, interior, blood supply, conducting systems. Synopsis of major arteries, veins and lymphatic vessels.
Digestive systems: Basic anatomical features of mouth, pharynx and oesophagus, and abdominal digestive organs in the monogastric species.
Respiratory System: Nasal cavity, paranasal sinuses, larynx, trachea, lungs. Functional anatomy of respiration.
Urogenital System: Urinary organs, male reproductive organs, female reproductive organs.
Nervous System: Organisation of nervous system – CNS, PNS, autonomic nervous system. Spinal cord and typical spinal nerve. General distribution of spinal nerve groups. Main gross features of the brain. Summary of various cranial nerves. Autonomic nervous system – sympathetic and parasympathetic divisions. Main principles involving ascending and descending pathways within CNS.
Special Sense Organs: eye – structure of eyeball and adnexae, extraocular muscles. Principles of visual pathways. Ear – external, middle and internal ears. Principles of auditory pathways.

J.8.1.4 AASC 3651: ANIMAL PRODUCTION

Module title: **ANIMAL PRODUCTION**
Code: AASC 3651
NQF level: 06
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1 x 3 hr paper)
Prerequisites: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description (content): This module covers the livestock production systems in the Southern African region with emphasis on Namibia. Specifically it addresses: the systems of production (commercial and communal, intensive, semi - intensive and extensive production systems); Importance of livestock to the Namibian economy. Animal breeds suitable for the Namibian environment (*bos indicus* versus *bos tauras*) and adaptability to local environments and their weaknesses. Feed resources for animals in different animal production systems. Challenges to, and mitigation of drought. Animal handling facilities (e.g. crushes, stockade, loading bays, chutes, boma) and various animal husbandry kits. General herd health management practices (dipping, dosing, vaccination).

J.8.1.5 AASC 3671: VETERINARY PHYSIOLOGY I

Module title: **VETERINARY PHYSIOLOGY I**
Code: AASC 3671
NQF level: 6
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1 x 3 hr paper)
Prerequisites: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description: This module will give students an in depth understanding of the functioning of the excitable and contractile cells, the functions and dynamics of the blood and other body fluids and the normal functions of the nervous, cardiovascular and digestives systems, their underlying mechanism of functions, regulation and how they respond to normal changes in the functional demands. Specific topics will be;
Nerve and Muscle: review of structure of cell membranes, nerve, and muscle. Resting cell membrane potentials. Action potential and their propagation. Functional classification of nerve fibres. Molecular basis of contraction. Mechanisms of varying strength of contraction in single muscle cells and whole muscles.

Body fluids: Compartments, composition, mechanisms responsible for movements of fluids between compartments. Determination of compartment volumes. Blood constituents, their functions and normal values in domestic animals. Haemostasis, Blood grouping.
Nervous system: functions, general receptor mechanisms, central information processing and storage, reflexes, the functions, organizations and functional mechanism of the autonomic, somatic, limbic, reticular activating, somesthetic and special sensory systems.
Cardiovascular and digestive system: functions, mechanisms and regulation of function. Different physiological states, main techniques used in assessing function, Normal values of quantifiable indicators of function in the main domestic species.

J.8.1.6 AASC 3612: BIOCHEMISTRY

Module Title: **BIOCHEMISTRY**
Code: AASC 3612
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
NQF Level: 6
Module assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1 x 3 hr paper)
Prerequisites: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description (Content): Introduction to Biochemistry: Structure and function of macromolecules (carbohydrates, proteins and lipids); Vitamins and Coenzymes; Molecular biology, Enzymes as catalysts; Nomenclature of enzymes; Factors affecting enzyme activities; Enzyme Kinetics - Michaelis/Menten and Lineweaver-Burk plot; Introduction to metabolism - Glycolysis, pentose phosphate pathway; Alcohol and lactic acid fermentation, TCA cycle, Inter-

relationships between glycolysis, PPP and TCA; Electron Transport Chain and Oxidative Phosphorylation; The Cori cycle; Photosynthesis and its significance to ecosystems; Glyoxylate cycle (oily seeds); Overview of the synthesis of disaccharides (lactose and sucrose) and polysaccharides (starch and glycogen); Gluconeogenesis; Pentose Phosphate Pathway; Regulation of carbohydrate metabolism; Diseases associated with carbohydrate metabolism; Regulation of gene expression – The *Lac* operon; Digestion and absorption of macromolecules (carbohydrates, proteins, lipids, nucleic acids) in animals; Introduction to Fat metabolism; Integration of carbohydrate and fat metabolism; use of Centrifuge, chromatography, DNA and protein electrophoresis

J.8.1.7 AASC 3632: GROSS ANIMAL ANATOMY II

Module Title: **GROSS ANIMAL ANATOMY II**
Code: AASC 3632
NQF: 6
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1 x 3 hr paper)
Prerequisite: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life

Module description: This module aims at providing students with in-depth knowledge of the clinically applied comparative anatomy with case studies of:
Chicken anatomy – important anatomical features of organs of thorax, abdomen, pelvis and head clinically; OR
Fish Anatomy – Clinically important aspects of the anatomy of skeleton, respiratory, digestive, urogenital, cardiovascular, nervous and intergumetary system. In each case the following specific topics will be covered:
The neck and thorax – vertebrate, joints, jugular groove, carotid sheath, thoracic wall, pleura, lungs, mediastinum.
Abdomen – abdominal wall including innervations, inguinal canal, reticulorumen, omasum, abomasums (exterior, interior relations) omenta, intestines, livers, pancreas, spleen, kidneys and adrenals.
Pelvis – oesteology, ligaments, pelvic canal, pelvic organs in male and female, mammary glands, pelvic nerves and lymphatics.
Forelimb – important features in ruminants of shoulder, arm, forearm and manus, hoof, blood and nerve supplies digits.
Hind limb – important features in ruminants of hip, thigh, leg and pes, blood and nerve supplies of digits.
Head – nasal cavity and para nasal sinuses, mouth, salivary glands, muscles of mastication, teeth, pharynx, larynx, nerves of head including relevance of dehorning, blood supply, lymphatic, eyeball.
Reproductive system: male and female organs

J.8.1.8 AASC 3652: VETERINARY PHYSIOLOGY II

Module title: **VETERINARY PHYSIOLOGY II**
Code: AASC 3652
NQF level: 6
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Course credits: 16
Module assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1x 3 hr paper)
Prerequisites: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life

Module description: This module aims to give students an understanding of the normal functions of the respiratory, endocrine, renal and reproductive systems, and their underlying mechanisms, regulation and how they respond to changes in their functional demand and the processes responsible for homeostasis. The specific topics will be:
Respiratory, endocrine, renal and reproductive systems: functions, mechanisms, regulation of function. Differences between domestic species, Adjustments in different physiological states. Main techniques used in assessing function. Normal values of quantifiable indicators of function in the domestic species.
Body metabolism and temperature regulation; the concept of energy metabolism. Heat and temperature, thermal comfort and thermo-neutrality. Thermo-regulatory effects and altered body temperature in domestic animals.

J.8.1.9 AASC 3672: VETERINARY HISTOLOGY

Module title: **VETERINARY HISTOLOGY**
Code: AASC 3672
NQF level: 6
Contact hours: Lectures: 4x 1hr L/wk for 14 weeks (56hrs); Practicals: 1 x 3hr Prac/wk for 14 weeks (42hrs)
Credits: 16
Module Assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1x 3 hr paper)
Prerequisite: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description: This modules aims to give students a thorough understanding of normal and diseases tissues. The way the body is constructed from the cellular to the organ levels and how different tissue types contribute and interact in the body are key themes of the course.The topics to be covered will be: Histological structure of the nervous, cardiovascular, respiratory, digestive, reproductive, urinary and lymphatic systems. Eye and ear histology, histology of the endocrine system and integument. Reference will be made to anatomical, physiological and histopathological conditions whenever appropriate. Instruction also includes an introduction to the practical applications of histology and the techniques involved.

J.8.1.10 AANS 3612: VETERINARY EMBRYOLOHY

Module title: **VETERINARY EMBRYOLOGY**
Code: AANS 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)
Credits: 16
Module Assessment: Continuous Assessment: 40% (2x assignments + 2 tests + at least 10x marked practicals). Exam: 60% (1x 3 hr paper)
Prerequisite: BLG 3411: Introduction to Biology; BLG 3512: Diversity of Life
Module description: This modules aims to expose students to the overall development of organisms from reproductive cells (sperms and ova). It begins by looking at General embryology and then looks in detail into the following topics:- Primary organs of reproduction and gametogenesis, fertilization, cleavage and formation of the morula and blastula, gastrulation and formation of the germ layers. Establishment of the embryonic membranes and body structures,

evelopment of organ systems in avian and mammalian embryos. Foetal membranes and placentae, types of placentation. Morphological differences in placentae of various domestic animal species. Principles of teratology incidence, causes, mechanisms and risks.

K. M. SC. RANGELAND RESOURCES AND MANAGEMENT

K.1 ADMISSION

K.1.1 The University of Namibia general regulations regarding admission of students to Masters Degree programmes shall apply.
K.1.2 Notwithstanding the above, students wishing to enroll 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.

K.2 ASSESSMENT

The following were adopted to ensure high standards and competitive degree quality:

K.2.1 A 3-hour theory examination at the end of each module;
K.2.2 A pass mark of 60% for all modules, including the thesis;
K.2.3 A weighting of 50:50 for continuous assessment (CA) and the final examination;
K.2.4 At least 3 different continuous assessments for each module for core modules and 5 for generic modules;
K.2.5 Only students with an attendance record of 80% of all module activities (excluding continuous assessment activities) and a minimum continuous assessment grade of 40% can write the final examination;
K.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 First Opportunity Examinations. A student who fails to get the required passing marks after the supplementary examination will have to repeat the failed module in the subsequent year.
K.2.7 A student can remain registered for a maximum of 4 years.
K.2.8 Student will only be awarded M.Sc. degree in Range Resource Management upon completion of all required modules with a pass mark of 60% or higher, including the thesis component.

K.3 DEGREE STRUCTURE

The following will be the structure of the degree.

K.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.

K.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.

K.3.3 Course work will be covered over two semesters in the first year while research and thesis work will be done in the second year.

K.3.4 There will be a maximum of 15 students per intake (minimum 5 students; see page 3) and new intakes will be done once in two years.

K.3.5 The degree course work will comprise of: 8 compulsory core modules, 2 (out of 7) elective core modules and 2 compulsory generic modules. Graduation requires the completion of minimum 240 credits in lines with NQA guidelines.

K.3.6 Core modules, 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.
K.3.7 Each core module will run over a 4-week block, while the generic modules will run over 28 weeks, across the two semesters.

K.3.8 Six core modules will be taught each semester with a week's break between the core teaching blocks.

K.3.9 Core module examinations will be written immediately after the module, during the inter-block break.

K.3.10 To counter the anticipated time-tabling problem regarding the 7 elective modules, there will be restricted possible module combinations and sequencing in the student's degree plan.

K.4 TEACHING MODE

This will include; lectures, field work, discussion seminars, case studies, group projects etc.

K.5 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.

K.6 PROGRAMME SCHEDULE

M.SC. IN RANGELAND RESOURCES MANAGEMENT (M SC RR & M)

K.6.1 FIRST YEAR

MODULE	CODE	MODULE TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AASC	5900	Research/ Exp Design & Analysis	9	2	0.3	8
AASC	5920	Geographic Info Systems & Remote Sensing	9	1.1	1.2	8
AASC	5981	Intro Integrated Resource Management	9	7/w	3/w	12
AASC	5991	Rangeland Ecosystem Structure & Function	9	7/w	3/w	12
AASD	5981	Soil Dynamics	9	7/w	3/w	12
AASW	5981	Water Dynamics	9	7/w	3/w	12
AASE	5981	Environmental Physiology	9	7/w	3/w	12
AASL	5981	Land Use Planning	9	7/w	3/w	12
AASF	5981`	Fodder Flow	9	7/w	3/w	12
AASR	5981	Rangeland Management	9	7/w	3/w	12
UAE	5819	Academic Writing for Postgraduate Students	8	04/56	0	16
TOTAL SEMESTER 1 CREDITS						**128**
Semester 2						
AASC	5900	Research/ Exp Design & Analysis	9	2	0.3	8
AASC	5920	Geographic Info Systems & Remote Sensing	9	1.1	1.2	8
AASC	5982	Wildlife Ecology & Management	9	7/w	3/w	12
AASC	5992	Rangeland Degradation and Its Mitigation	9	7/w	3/w	12
AASN	5982	Nutrition of Foraging Animals	9	7/w	3/w	12
AASS	5982	Sustainable Livelihoods	9	7/w	3/w	12
AASR	5982	Range Biodiversity and Conservation	9	7/w	3/w	12
AASE	5982	Natural Resource Economics	9	7/w	3/w	12
AASP	5982	Natural Resource Policies	9	7/w	3/w	12
UAE	5819	Academic Writing for Postgraduate Students	8	04/56	0	16
TOTAL SEMESTRER 2 CREDITS						**116**
TOTAL FIRST YEAR CREDITS						**244**

K.6.2 SECOND YEAR

COURSE	CODE	TITLE	NQF LEVEL	L	P	CREDITS
Semester 1						
AASC	6910	Research Project / Thesis	9			
Semester 2						
AASC	6910	Research Project / Thesis	9			
						128
TOTALS						**340**

COMPULSORY AND ELECTIVE MODULES

YR 1	**Semester 1**	
	Subject	**Comment**
	ASC 5900: Research / Exp Design & Analysis	Compulsory
	ASC 5920: Geog Info Systems & Remote Sensing	Compulsory
	ASC 5981: Intro Integrated Resources Management	Compulsory
	*ASR5981: Rangeland Management	Compulsory
	ASC 5991: Rangeland Ecosystem Structure & Function	Compulsory
	ASD 5981: Soil Dynamics	Elective
	AWD5981: Water Dynamics	Elective
	AEP 5981: Environmental Physiology	Elective
	ALU 5981: Land Use Planning	Elective
	AFF 5981: Fodder Flow	Compulsory
	UAE 5819: Academic Writing for Postgraduate Students	Compulsory (first or second semester)
	Semester 2	
	ASC 5900: Research / Exp Design & Analysis	Compulsory
	ASC 5920: Geo Info Systems & Remote Sensing	Compulsory
	ASC 5982: Wildlife Ecology & Management	Elective
	ASC 5992: Rangeland Degradation & Its Mitigation	Compulsory
	ANF 5982: Nutrition of Foraging Animals	Compulsory
	AST 5982: Sustainable Livelihoods	Compulsory
	ARB 5982: Range Biodiversity & Conservation	Compulsory
	ASE 5982: Natural Resources Economics	Elective
	ASP 5982: Natural Resource Policies	Elective
YR 2	**Semester 1**	
	Subject	**Comment**
	ASC 6910: Research Project/Thesis	Compulsory

	Semester 2	
	ASC 6910: Research Project/Thesis	Compulsory

K.7 MODULE DESCRIPTORS: RANGELAND RESOURCES MANAGEMENT

K.7.1 FIRST YEAR MODULES

K.7.1.1 AASC 5910: RESEARCH / EXPERIMENTAL DESIGN AND ANLYSIS

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.

K.7.1.2 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.

K.7.1.3 AASC 5981: INTRODUCTION TO INTEGRATED RESOURCES MANAGEMENT

Module Title	**INTRODUCTION TO INTERGRATED RESOURCES MANAGEMENT**
Code	AASC5981
NQA Level	9
National Professional Standards Competencies	N/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.

K.7.1.4 AASC 5991: RANGELAND ECOSYSTEM STRUCTURE AND FUNCTION

Module Title	**RANGELAND ECOSYSTEM STRUCTURE AND FUNCTION**
Code	AASC5991
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)

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.

K.7.1.5 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.

K.7.1.6 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.

K.7.1.7 AASE 5981: ENVIRONMENTAL PHYSIOLOGY

Module Title	**ENVIRONMENTAL PHYSIOLOGY**
Code	AASE 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)
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.

K.7.1.8 AASL 5981: LAND USE PLANNING

Module Title	**LAND USE PLANNING**
Code	AASL 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)
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.

K.7.1.9 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.

K.7.1.10 AASR 5981: RANGELAND MANAGEMENT

Module Title:	**RANGELAND MANAGEMENT**
Code:	**A**ASR 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.

K.7.1.11 AASC 5982: WILDLIFE ECOLOGY AND MANAGEMENT

Module Title **WILDLIFE ECOLOGY AND MANAGEMENT**
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.

K.7.1.12 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.

K.7.1.13 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.

K.7.1.14 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.

K.7.1.15 AASR 5982: RANGE BIODIVERSDITY 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).

K.7.1.16 AASE 5982: NATURAL RESOURCE ECONOMICS

Module Title **NATURAL RESOURCE ECONOMICS**

Code	AASE5982
NQA Level	9
National Professional Standards Competencies	N/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.

K.7.1.17 AASP 5982: NATURAL RESOURCE POLICIES

Module Title	**NATURAL RESOURCE POLICIES**
Code	AASP5982
NQA Level	9
National Professional Standards Competencies	N/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

K.7.1.18 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.

K.7.2 SECOND YEAR: THESIS COMPONENT

K.7.2.1 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 3409	Computer Literacy	Exemption through:	UCLC 3409	Computer Literacy			
ULCE 3419	English Communication	Exemption through:	ULEG 2410	English for General Communication			
	and Study Skills						
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 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			
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***		

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**
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		
			AASC 2611	Intensive Animal Production and		
			AASC 2612	Extensive Animal Production		
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	Exemption through:	ULEG 2410	English for General Communication		
	and Study Skills					
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		
			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***	

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 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	Priciples of Wildlife Management				**AIES 3621**	**Priciples 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 Macroeconomics				**AGEC 3692**	**Principles of 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
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	AGEC 2402 Basic Economics
and Management	
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

MODULE EQUIVALENTS	
OLD GRN CURRICULUM	**NEW UNAM CURRICULUM**
AEC 2212 Financial Management	AGEC 2501 Financial Management
AEC 2222 Indigenous Resource Management	AGEC 2521 Introduction to Rural Sociology
and Rural Sociology	
ASC 2212 Range Management II	AASC 2511 Range Management
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

MODULE EQUIVALENTS	
OLD GRN CURRICULUM	**NEW UNAM CURRICULUM**
AEN 2312 Farm Structures	ACSC 2612 Farm Technology II
AEN 2322 Irrigation + Drainage	no equivalent identified