Purpose of the handbook

The primary function of a University is to educate students and carry out appropriate research. The purpose of our administrative processes is to support these primary functions and help them to be carried out more efficiently.

The quality assurance systems described in this handbook are designed to improve the quality our teaching and ensure that our assessments are fair, consistent and of the appropriate international standard.

The purpose of this handbook is to provide EVERYONE at PNG-UNRE with a definitive guide to the Administrative Processes which regulate our teaching and the education related quality assurance systems.

Contacts
General enquires should be addressed to:

Student Administration

Senior Assistant Registrar
The Papua New Guinea University of Natural Resources & Environment,
Private Mail Bag, Kokopo
East New Britain Province
Phone: (675) 983 9249; Fax (675) 983 9166 (ENBP)
or

Mr Peter Navus
Head, Department of Agriculture
Email: pnavus@unre.ac.pg
or

Mr Aisi Anas
Acting Head, Department of Fisheries and Marine Resources
Email: aanas@unre.ac.pg
or

Mr Leo Dawson
Head, Department of Forestry
Email: ldawson@unre.ac.pg

The information contained in this handbook was correct at the time of going to press (February 2018), but may be subject to alteration. Please bring any errors or omissions to the attention of Dr Cathryn Warren via the Vice Chancellor’s office or by email at cathrynjunewarren@gmail.com
Purpose of the handbook

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SECTION A: INTRODUCTION
Welcome Messages

Vice Chancellor
The Vudal campus will be your new home for the next few years. Here you will meet new friends and learn more about your chosen subject. Here you will develop new skills, such as how to solve complex real life problems. Uniquely in PNG this University is dedicated to the developing the sustainable utilisation of our nation’s natural resources and YOU are an important part of our mission. I would therefore like to take this opportunity to welcome you into our University community, on behalf of all the staff here. We are all dedicated to helping you to acquire the skills and knowledge that you require to become the future leaders our agricultural, fisheries, forestry and tourism industries.
To reach this far in your education, you have already demonstrated that you are a part of an elite. Only around 5% of our population has the opportunity to benefit from a University education. Congratulations. However, being at university is hard work. A University qualification, would have little value if obtaining one was easy. Arriving at Vudal is not the end of your journey, it is the start of a whole new adventure. As with so
many things in life, the more effort you invest in your studies at UNRE the more you will benefit.

A University education is not all about hard work. It should also be fun. The academic staff that you will work with during your time here are passionate about the subjects that they teach. Hopefully you will be infected by their enthusiasm and become just as fascinated by these subjects.

Please try and enjoy your time at UNRE. Working hard and doing well in your studies can be a very rewarding activity in its own right, but it is also a stepping stone to a more successful future for you and your nation.

Welcome to PNG-UNRE
Professor John Warren
Vice Chancellor

Heads of Department
Agriculture

Welcome to the Department of Agriculture. We congratulate all of you in being selected for the programme and take the opportunity to wish you the very best in your studies with us here at Vudal campus in East New Britain Province.

The Department of Agriculture comprises enthusiastic individuals who are dedicated to the education of students and the wider rural community. You are expected to focus your energy on achieving your potential when you register with PNG-UNRE. One of the main activities of course is learning. You will be expected to participate in workshops and conducting research into the methods and techniques of agricultural production and sustainability relevant to the needs of Papua New Guinea. Annually we look forward to welcoming new students and following graduation watch our graduates embark on a diverse range of interesting and relevant careers. You now have the opportunity to join this group and we hope you will value the assistance and training you will obtain along the way.

The Department of Agriculture has a long history of producing the critical workforce for PNG since it opened its doors in 1967. This legacy continues today. All courses offered combine a foundation in basic sciences with applied agricultural and fisheries sciences, management and business skills, practical work including farm practice and industry experience. The result is an excellent graduate employment outcome and very high student satisfaction levels.

To both categories of students, whether new or continuing, it is imperative to note the importance of how you apply and synchronize yourselves as young adults and responsible citizens of this campus and country. Most students take time to settle into University life. A steady work programme gives the best chance of passing and enjoying the social aspects of University life. Our staff are happy to provide advice or assist with problems as they arise. The University also provides counseling through the Students Support Services office.

It gives me great pleasure every year to welcome new students to the Department, to wish you well in your university studies and hope that your time with us will be both stimulating and rewarding.

Peter Navus
Head of the Agriculture Department

Fisheries and Marine Resource

As the Acting Head of the Department of Fisheries & Marine Resources of the University of Natural Resources and Environment (PNGUNRE), it is a great pleasure for me to welcome you to the Department of Fisheries and Marine Resources which is responsible in delivering the Fisheries, Marine and Aquaculture Resources program at PNGUNRE.

Firstly, I congratulate all students who have chosen to undertake this fisheries program at the PNGUNRE and now take the opportunity to wish you the very best in your studies with us here in Vudal.

I would also like to stress the importance of your commitment to your studies and ask that you all give every effort to working with us to make this programme a success for all concerned.

Our courses combine a foundation in basic science with applied fisheries & marine
science, aquaculture, fisheries operations, renewable resource management, resource and environmental conservation, business skills of natural resources and practical work including industrial experience. The Department of Fisheries and Marine Resources has a team of dedicated people and you have the opportunity to join this group and we hope you will value the assistance and training you will obtain along the way. Our academic, technical and support staff are happy to provide advice or assist with issues as they arise. It gives me much pleasure to welcome you to this University, to wish you well in your studies and hope that your time with us will be both stimulating and rewarding. Welcome! 
Mr. Aisi S Anas A/Head of Department – Fisheries

Forestry
As the Head of the Forestry department, I would like to welcome you to the Papua New Guinea University of Natural Resources and Environment, and to a phase of your life which will be one of the most important of it. The Forestry department is responsible for delivery of our Forestry degree and diploma programmes, for co-ordinating forestry and related research projects, and for management of the university tree plantations and nursery. Our Forestry programme here at UNRE is bold and ambitious, and puts PNG centre-stage in the Pacific for eco-forestry and natural resource sustainability studies. We will teach you about PNG’s precious forest resources, as well as those from around the world. You will learn such critical subjects as forest ecology, plantation management, and inventory and assessment. But we will take you beyond these subjects into a greater understanding of how climate change and water catchments work, how carbon is stored and traded internationally, and about the relationships between people and forests. We will also give you an understanding of how economics work, so that with a sound and solid background in all of these areas, you can go on in your careers with the skills you need to be decision-makers and game-changers not just in PNG, but around the world. The decision you have made to undertake a programme of study at UNRE is to be taken with the utmost seriousness. As a UNRE graduate, you will be responsible in some way for shaping the future of your country, but before you can reach this stage, you will be responsible for shaping your own. Our job as your lecturers and academic staff is to support you on your journey through this phase of your life, and to help you to be the best that you can be. At many times you will not find the learning to be easy, but if you are interested in your subject and dedicated in your studies, you will be richly rewarded for it in the years to come, and be able to look back at your time in UNRE with pride and dignity. Welcome, and the very best of luck! 
Mr. Leo Dawson HoD Forestry

About the University
PNG UNRE has developed from the Vudal Agricultural College, which was first established in 1965 as a male only college, with the first female students admitted ten years later. The college became the University of Vudal in 1997. The name was changed to PNG-UNRE to signal the start of the process to become a multidiscipline University. The University currently offers sixteen undergraduate courses, with a Diploma, Higher Diploma, Degree, and Honours Degree in Sustainable Tropical Agriculture, Sustainable Fisheries and Marine Resources, Sustainable Tropical Forestry, and Sustainable Livestock Production. The University also offers a Graduate Certificate, and Master’s Degree in Management Studies.

Location
PNG-UNRE is located in East New Britain Province, on the Kerevat plateau, about 40 km...
from Kokopo. The lush tropical surroundings make the campus an ideal setting for the University’s natural resources and environment focus.

Farm Operations and Forestry Plantations
The farm occupies 150 hectares for crop and livestock production, with forestry plantations covering a further 30 hectares. Cocoa, vegetables and root crops are grown, while livestock include cattle, goats, pigs and poultry. The forestry plantations comprise around 30 hectares of balsa and a further 10 hectares of teak, mahogany, canarium (galip) and other native species. The forestry department is also responsible for a 28 hectare nature reserve. In addition to providing food for local consumption and generating income for the University, the farm and forestry plantations are the main teaching resources for practical agriculture and horticulture. They also provide financial and management data for teaching and research purposes.

Kairak Vudal Resource Training Centre
A further resource which students and staff are encouraged to visit is the Kairak Vudal Resource Training centre. Essentially a dynamic field laboratory, this provides valuable farmer training to rural communities through the Integrated Agriculture Training Programme (IATP). The training centre acts as the industry partner for a number of students during their industry project, and provides employment for many of our graduates.

SECTION B: KEY INFORMATION FOR STUDENTS
Academic
Attendance The University requires students to attend all timetabled activities. All the evidence points to a clear correlation between good attendance at classes and success in your studies. Relying on your friend’s lecture notes or your previous knowledge of the subject will not be enough to get the marks you are capable of achieving. Students who consistently fail to attend classes may be prevented from sitting the final examination.

Computer facilities are provided for research and academic purposes. Rules for their proper use are outlined in the student rule book (Section J of this handbook).

Employability We are committed to helping you develop skills as competent scientists so that you graduate with a degree that you can be proud of. However, we also recognise that a qualification is just part of preparing you for what we hope will be a fulfilling future career. In order for you to obtain employment or opportunities for further study on completion of your degree there are other skills that you will need. Keep a record of any extra-curricular activities and take time to reflect on your own learning, performance and achievements to help you to play to your strengths and plan your academic, personal and career development.

Fees Students will not be enrolled or entitled to attend lectures, tutorials, seminars etc. if they have not paid the prescribed fees by the due date, or proved to the Vice-Chancellor that their sponsor will pay the fees. Any student unable to pay fees by the due date may apply in writing to the Vice-Chancellor who may grant an extension. The application must be accompanied by proper evidence of extenuating circumstances.

Library The Library holds approximately 25,000 volumes of books and pamphlets. It also has a small reference collection of about 1000 volumes as well as selected databases
including the PNG Agricultural Bibliographic Database, and others on CD ROM. Internet access is available and students can use this service to search for information for academic and research purposes. The library has a seating capacity of over 100 study chairs, and can accommodate 10 readers in the reading area.

The library provides a lending service for all registered students free of charge. The library provides free access to all resources for all categories of users and duty librarians are available at all times to provide assistance. The library can also order reference material through the Inter-Library Loans service. All users are expected to abide by the rules of the library (Section J of this handbook).

**Opening hours**

**During Semester**

- Monday to Thursday: 8:00 am – 9:00 pm
- Friday: 8:00 am – 4:00 pm
- Saturday: CLOSED
- Sunday: 2:00 pm – 5:00 pm

**During Vacation**

- Monday to Friday: 8:00 am – 4:00 pm
- Saturday: CLOSED
- Sunday: CLOSED

**Photocopying and Printing** The library provides a photocopying service at cost, and undergraduate students are not permitted to use photocopiers located in Departments. The ICT service provides a limited printing service to students, allowing them to print copies of assessed work.

**Readmission** Students who have withdrawn, discontinued, or were suspended and wish to return to studies must apply for readmission by completing a Non-School Leaver Application Form. These forms are available from the Academic and Student Administration Office. Completed forms must be submitted by September 30th of each year. Suspended students can only be readmitted to the University after serving their full suspension period.

**Registration** All students must register annually for their courses. Candidates may be permitted to register on a part-time basis provided that the combined contact hours of the modules do not exceed one third of the total contact hours.

**Success at PNG-UNRE** You are among the privileged few of our population to receive a University education. We recognise that you are investing a significant amount of your time, money and energy on your studies. We offer you access to excellent learning support and facilities to enable you to achieve your potential, but to a large extent your success will depend on what you put into your studies.

**TESAS Scholarships (AES, HECAS)** A registered student must achieve a Grade Point Average (GPA) of 3.6 in the two semesters in one academic year to qualify for AES. To qualify for HECAS, a student must have a GPA of 2.3 and above in the same period.

**Text-books and course notes** Owing to the cost of books there are currently only a few prescribed texts, which are essential to purchase. However, there are number of key books relevant to each module, which are placed on the prescribed reading list. Full details will be provided by the lecturer. The library coordinates issue of stationary items to students in receipt of a scholarship (AES, HECAS, or Corporate) according to the value allowed by their sponsor.

**Withdrawal** Students withdrawing from a course or cancelling their registration in full must notify the Vice-Chancellor in writing. Fees will accrue until such notification has been received unless he agrees otherwise. When notification is received within four weeks from the date of registration a full refund of all tuition fees paid for the semester will be made. Reasons must be given for withdrawal. Students who leave after the deadline will be deemed to have failed the modules enrolled for that semester. Special consideration for late withdrawal may be given to students for medical reasons. This must be supported by a medical certificate. Partial refunds may be processed for students who withdraw on medical grounds.
Student Support

Accommodation Room allocation and furnishings are coordinated by Student Support Services (SSS). Changes to allocated rooms can only be made on the authorisation of the SSS director. The rules governing the use of the Universities halls of residences are outlined in the student rule book (Section J of this handbook), and it is important that all students are familiar with them. Students must respect all University property and ensure rooms and surrounding areas are kept clean and hygienic. Regular room inspections are made by staff to ensure this is the case.

Church Services Most denominations have local churches within the community or worship in classrooms. Students are encouraged to attend.

Messing and Catering Services Meals are prepared and served at the student mess. The menu varies from PNG to Western style dishes. The dining hall can cater for up to 250 students at any one time, and it is important that students adhere to meal times. Catering orders for functions can be placed with mess staff.

Meals Times

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<tr>
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<th>Weekdays</th>
<th>Weekends</th>
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<tr>
<td>Breakfast:</td>
<td>6:30 – 7:30</td>
<td>7:00 – 8:00</td>
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<tr>
<td>Lunch:</td>
<td>11:30 – 12:30</td>
<td>12:00 – 1:00</td>
</tr>
<tr>
<td>Dinner:</td>
<td>5:00 – 6:00</td>
<td>5:00 – 6:00</td>
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Public relations You are encouraged to inform the Public Relations Office of activities you are involved in such as field trips, seminars, research projects, club, church, community, sports activities or even an interesting lecture. Articles developed from these events will be used in the University newsletter Campus Voice, and sent to the mainstream print and electronic media for publication or broadcast. The Public Relations Office also sells University souvenir items.

Sports and Recreation facilities include; rugby and soccer fields, basketball courts, and netball courts. Students are encouraged to participate in sports for physical fitness.

Student Support Services. The student Support Services Office is open on Monday to Friday from 7:45 am to 4:06 pm each working day. If there is an urgent problem, it may be possible to see one of the staff outside of the above times. Student Support Services provide information, help and advice for a wide range of personal and study related problems, including accommodation, spiritual encouragement, withdrawal from studies, etc. This service is free and confidential.

Health and Safety

Alcohol and Illicit drugs are not permitted on campus, and their possession, trafficking or use can result in disciplinary action or criminal prosecution as outlined in the student rule book (Section J of this handbook).

Emergency Procedures

Earthquake Many of you will have come from areas of the country not affected by earthquakes, but here in East New Britain Province, earthquakes are a common occurrence. Take advice from local students as to whether an earthquake is a cause for concern.

In the case of a major earthquake you will reduce your chance of injury if you:

- **DROP** where you are, onto your hands and knees. This position protects you from being knocked down and also allows you to stay low and crawl to shelter if nearby.
- **COVER** your head and neck with one arm and hand.
- **HOLD ON** until shaking stops.

If indoors, and you can leave the building safely, then do so. Otherwise, if a sturdy table or desk is nearby, crawl underneath it for shelter. If no shelter is nearby, crawl next to an interior wall (away from windows). Stay on your knees; bend over to protect vital organs. Avoid exterior walls, windows, hanging objects, mirrors, tall furniture, large appliances, and kitchen cabinets with heavy objects or glass. However, do not try to move more than 5-7 feet before getting on the ground.

If outside, move to a clear area if you can safely do so, away from buildings, trees, power lines and vehicles. Then Drop, Cover, and Hold On. This protects you from any objects that may be thrown from the side, even if nothing is directly above you.
Fire: If you can easily extinguish the fire, then do so. Then raise the alarm and evacuate the building.

Incident Reporting  All incidents, whether accidents, ill health, near misses, damage to equipment, property or vehicles should be reported immediately. Near misses are just as important as accidents as the cause and the actions put in place to prevent reoccurrence will be the same as if an accident had occurred.

Medical Services All students are required to fill in a medical form. Compulsory medical checks will be made during orientation and registration week. If you feel unwell you should provide your personal health record and current ID card at the clinic reception for assessment. Most cases will be treated at the clinic, but if necessary you will be referred to hospital for further diagnosis. PNG-UNRE Vudal clinic is a recognized VCCT HIV/AIDS & STI site and students can make use of the facility for HIV & STI counselling and testing. In emergency or after hours cases contact security services.

Security services are available 24 hours a day to provide security for staff, students and their property. They are able to attend to emergency situations faced by staff and students.

Student Rule Book  Rules governing student conduct are essential for the safe, efficient and fair running of the University and to ensure UNRE is a pleasant place to live and study. The rules, disciplinary procedures, and penalties, are outlined in the Student Rule Book (Section J of this handbook). A student upon whom a penalty has been imposed may appeal to the Vice-Chancellor in writing not later than three days after the student has been informed of the penalty imposed.
SECTION C: STAFF

Administration

Chancellor Professor Kenneth Sumbuk

Vice Chancellor Professor John Warren, PhD (York), BSc (Newcastle), PGCE (Bangor)

Pro Vice Chancellor (Academic) Associate Professor John Warren, PhD (York), M. Eng. Biotech (University of Yamanashi, Japan), PGD Chemistry (UPNG), BSc. Food Tech (PNGUNITECH).

Acting Assistant Registrar (Academic and Student Administration) Ms Gali Ibos, Bachelor in Management, Divine Word University (DWU), Dip. Business Studies

Bursar Mrs Malom Tamti, Dip. Business Studies (DWU)

Public Relations Ms Lythia Suitawa, Diploma Media Studies, (UPNG)

Head of IT and Library Mr Russell Deka, Master of IT, (Open Univ. in Japan), B. Engineering (Tokushima Univ. Japan)

Senior Librarian Mr Steven Ule, Bachelor of Arts in Information and Communication, (UPNG)

Student Support Services Director Mr Erike Sifuma, Master in Education Leadership, (MEdL) (DWU), PGDE (UOG), BA(Hons) Linguistics (UPNG)

Medical Clinic Sister Nancy Galoko, Health Teaching (UoG), Cert. in General Nursing

Catering Supervisor Mr Robert Skeeter

Department of Agriculture Administration

Head of Department Mr. Peter Navus, MSc (Reading), PGD RSM (UQ), Graduate Cert in Communication for Science and Tech (PNGUNITECH), B. Agr. (UPNG).

Administration Officer Mrs. Linda Roberts, Dip. Public Admin (PNGIPA), Cert. Secretarial (Rabaul Business College), Cert. Teaching (Gaulim Teachers College), Cert. Descriptive Statistics (PNGUNRE).

Administrative Clerk Mrs. Meriba Darius (Cert, PETT, Malaguna Technical College),

Lecturers


Biology/Microbiology Dr Nason Pue, PhD (UQ), Master of Biotech (UQ), BSc. (Microbiology/Biotech) (Victoria Uni. Melbourne), Dip. Tropical Agr. (UoV).

Biotechnology Ms. Betty Kenny, Master of Scientific Studies (Newcastle), BSc (UPNG).

Chemistry Dr Cathryn Warren PhD (York), BSc (York), PGCE (Aberdeen)

Communications Ms. Stephanie Tringin, B. Trop. Agr. (PNGUNRE), Dip. Tropical Agri. (PNGUNRE).

Crop Sciences & Land Use Mr Joachim Pitala, M. Sc. Agr (UNE), PGD Agr (PNGUNITECH), B.Sc. Agr. (UPNG).

Food Technology Mr Peter Nguna. MSc. Appro TECH (FLEN UNI, Germany), B.Sc. Food Tech (PNGUNITECH), PGD Tech (Massey Uni, NZ).

ICT for Natural Resources Mr Russell Deka, Master of IT, (Open Univ. in Japan), B. Engineering (Tokushima Univ. Japan)

Management Mr. Peter Navus, M. Sc. (Reading), PGD RSM (UQ), Graduate Cert in Communication for Science and Tech (PNGUNITECH), B. Agri. (UPNG).

Mr. Adolf Wellip, MSc Natural Res Studies (UQ), BA (UPNG), Dip. Teaching (UOG).
Ms. Naomi Mwyawa, M. Agribusiness (UQ), B. Trop. Agr. (Hons) (UoV.)

Post-Harvest Technology  Associate Professor Aisak Pue, PhD. Environmental Toxicology, (UQ), M. Eng. Biotech (University of Yamanashi, Japan), PGD Chemistry (UPNG), BSc. Food Tech (PNGUNITECH).

Research Methods Professor John Warren, PhD (York), BSc (Newcastle), PGCHE (Bangor)

Rural Dev. Mr. Thomas Suri Taisa, Masters Agr. (Plant Breeding, Sydney University), PGD Agr. (Lincoln), B Agr. Sc. (PNGUNITECH), Cert Scientific Communication (PNGUNITECH), Cert TQM (PNGUNRE).


Soil Science Mr. James Aipa, M. Sc. (Soil Sc.) South China Agriculture University, PGD in Soil Sc. (PNG UniTech), B. Sc. (Agriculture) (UniTech), Dip in Teaching (UPNG GTC)

Year Coordinators

Year 1 Coordinator Mr. Nason Pue.

Year 2 Coordinator Mr. James Aipa.

Year 3 Coordinator Mrs. Kathleen Diapong Patak.

Year 4 Coordinator Ms. Betty Kenny.

Industry Project Ms Naomi Mwyawa.

Technical Instructors

Mr. Inia Bunsu, B. Trop Agr. (PNGUNRE), Dip Trop Agr. (UoV), Cert. Environmentally Friendly Fertilizer Production, Demonstration & Application for Developing Countries (South China Agricultural Uni).

Mrs. Kathleen Diapong Patak B. Tropical Agr. (PNGUNRE).

Technical Staff

Senior Technical Officer (Lab. Calibration) Mr. Clement Nelson, Dip Tropical Agri. (UoV)).

Technical Officer (Lab. Analytical), Mr Rudolf Tarue, BSc. Food Tech (PNGUNITECH)

Technical Officer (Crop Demonstration): Mr. Sombo Mangupe, Dip Tropical Agr. (PNGUNRE), Cert. Rice Cultivation Technique Development (JICA, Japan), Cert. Insect Diagnostic Workshop (NARI), Cert, Descriptive Statistics (PNGUNRE).

Laboratory Attendant: Ms. Wendy Wanio, Cert. Laboratory Techniques in Analytical and in organic Chemistry level 1 (PNGUNITECH), Cert. Attendance Insect Diagnostic Workshop (NARI), Kerevat, Cert. Microsoft Excel Spread Sheet (KVRTC), Cert. Basic Computing (KVRTC).

Department of Fisheries and Marine Resource.

Administration

Head of Department Mr Aisi Anas, BSc Hons 1st Class, Fisheries (UPNG), BSc. Biology (UPNG), PhD Candidate (Fish Ecology, UQ)

Administrative Officer Mrs Thelma Wartovo, Cert. Secretarial Studies (Lae Tech)

Lecturers

Aquaculture Mr Boas Malagat, BTAgri (UNRE 2010)

Fisheries and Aquatic Ecology Mr Lloyd Werry, MSc (Wageningen), PGD Biol (UPNG), BSc (UPNG)

Fisheries Biology Mr Joseph Aitsi, MSc Marine Science (Ryukyu, Japan), BSc (Unitech)

Fisheries Business Ms Dorothy Worogop, Postgrad Cert. Management (UNRE 2014); Postgrad Cert in commerce (Uni Queensland 2007)

Fisheries Management, Law and Economics Mr Walain Ulaiwi, BSc (Fisheries), PNG Unitech (1985)

Fisheries Sciences Mr Aisi Anas, BSc Hons 1st Class, Fisheries (UPNG), BSc. Biology (UPNG)
Marine Management & Conservation  To be appointed

Marine Sciences  Mr Vonklauss Siwat, MSc.  
Marine Science (Diponegoro Uni, Indonesia),  
Bachelor FMR (PNGUNRE)

Post-Harvest  Mr Yaosa Kaikar, BSc (Food  
Tecnology) PNG Unitech (1993)

Year Coordinators

Year 1 Coordinator  Mr Nason Pue

Year 2 Coordinator  Mr Yaosa Kaikar

Year 3 Coordinator  Ms Dorothy Worogop

Year 4 Coordinator  Mr Lloyd Werry

Year 3 Industry & Community Attachment  
Coordinators  Ms Dorothy Worogop, Mr Joseph Aitsi

Year 4 Undergraduate Research Project  
Coordinator  Mr Lloyd Werry

Technical Staff

Technical Officer (Aquaculture)  Mr Mathew  
Gati, Dip. FMR (PNGUNRE)

Technical Officer (Fisheries Science and  
Research)  To be appointed

Technical Officer (Marine Science)  Mr. Roger  
Routuna, Bachelor FMR (PNGUNRE)

Technical Officer (Laboratory)  Mrs Bilhah  
Routuna, Bachelor FMR (PNGUNRE)

Department of Forestry

Head of Department  Mr Leo Dawson, MSc.  
Environmental Forestry (Tropical), University  
of Wales, Bangor, UK, BSc. Conservation and  
countryside management, University of  
Wales, Bangor, UK

Administrative Officer  Ms Nancy ToRavie  
Cert. Secretarial.

Technical Officer  Mr Daniel Waldi, Bachelor of  
Forest Management (UNITECH), Dip Trop. Agr.  
(UNRE)
SECTION D: COURSE INFORMATION

Codes:
A = Agriculture F= Forestry
M = Fisheries and Marine N = Livestock
T = Tourism

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<tr>
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<td>Unique identifier</td>
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NB Diploma code modules only in year 3. These are duplicate degree modules but with different assessments.

The first year is common to all courses.

Department of Agriculture
The Department offers courses aimed at ensuring that PNG has the graduates required to guarantee a secure, sustainable supply of food, and to carry out research designed to address the problems faced by our modern agriculture industry.

Advanced Diploma in Sustainable Tropical Agriculture. This is a three year full time undergraduate course. Students can leave the course with a Diploma after having successfully completed the second year.

Bachelor’s Degree/Honours Degree in Sustainable Tropical Agriculture. These are four year full time undergraduate courses. Students are selected for entry into the third year of the Degree programme based on their marks in the second year of the Diploma in Sustainable Tropical Agriculture which must equal or exceed 65%. High achieving students can gain an honours degree after completing a dissertation in year four.

Degree in Sustainable Tropical Agriculture (Bridging) Students already holding an Advanced (three year) Diploma in Tropical Agriculture followed by at least a year of industry experience can apply to enter the Bachelor of Sustainable Tropical Agriculture bridging programme via direct entry into the final year programme for the degree. The module is subject to demand and accommodation space being available. Enrolment is competitive and subject to eligibility conditions.

Diploma in Sustainable Livestock Production. This is a three year full time undergraduate course. Students can leave the course with a Diploma after having successfully completed the second year.

Bachelor’s Degree/Honours Degree in Sustainable Livestock Production These are four year full time undergraduate courses. Students are selected for entry into the third year of the Degree programme based on their marks in the second year of the Diploma in Sustainable Livestock Production which must equal or exceed 65%. High achieving students can gain an honours degree after completing a dissertation in year four.

Postgraduate Degree For some careers, especially those requiring research skills, training beyond the level of Bachelor is required. Students achieving Honours in their degree modules will be able to undertake postgraduate study for awards of Postgraduate Diploma, Masters or PhD level at PNGUNRE or other Papua New Guinean or overseas Universities. The Department of Agriculture invites applications for enrolment in Higher Degrees by Research as a full-time or part-time candidate. The Master research degree has minimum duration of 18 months full-time. The PhD is awarded by examination of a thesis based on independent research carried out over a minimum period of three years.

Course Structure

Sustainable Tropical Agriculture
Year 1 Sustainable Tropical Agriculture Diploma/Degree Semester 1 Modules
- A111 Communication Skills
- A112 Introduction to Biology
• A114 Introduction to Chemistry
• A115 Introduction to Agriculture
• F111 Introduction to Forestry
• M111 Introduction to Fisheries

**Semester 2 Modules**
• A123 Natural Resource Conservation & Utilisation
• A126 On Farm Practice
• A127 Introduction to Economics & Management
• A128 Applied Biology
• A129 Physical Science
• T121 Introduction to Tourism

**Year 2 Sustainable Tropical Agriculture Diploma/Degree**

**Semester 1 Modules**
• A211 ICT for Natural Resources
• A212 Applied Mathematics
• A213 Health and Safety
• A215 Principles of Soil Science
• A216 Introduction to Plant Science
• N211 Introduction to Animal Science

**Semester 2 Modules**
• A221 Sustainable Land Use and Management
• A224 Business and Management
• A227 Agriculture Mechanisation
• A228 Agricultural Protection
• M229 Applied Ecology
• N222 Animal Production

**Year 3 – Sustainable Tropical Agriculture Diploma**

**Semester 1 Modules**
• AD311 Statistics
• AD312 Applied Rural Technology
• AD313 Work Experience Placement between year 2 and 3
• AD314 Extension Methods
• AD315D Agronomy and Crop Nutrition

**Semester 2 Modules**
• AD322 Research Methods
• AD323 Crop Production
• AD325 Applied Entomology
• AD326 Farm Business Projects

**Year 4 – Sustainable Tropical Agriculture Degree/Honours Degree**

**Semester 1 Modules**
• A411D Industry Project or
• AH411D Research Project I
• A413 Entrepreneurship
• A414 Resource Management
• A416 Principles of Food Processing
• N411 Principles of Genetics

**Semester 2 Modules**
• A421 Plant Breeding and Biotechnology
• A422D Current Issues in Natural Resources or
• AH422D Individual Project II
• A423 Marketing Management
• A425 Plant Pathology
• N421 Livestock Integrated Systems

**Sustainable Livestock Production**

**Year 1 Sustainable Livestock Production Diploma/Degree**

**Semester 1 Modules**
• A111 Communication Skills
• A112 Introduction to Biology
• A114 Introduction to Chemistry
• A115 Introduction to Agriculture
• F111 Introduction to Forestry
• FD324 Sustainable Palm Oil
• M321 Aquaculture
• M111 Introduction to Fisheries

**Semester 2 Modules**
• A123 Natural Resource Conservation & Utilisation
• A126 On Farm Practice
• A127 Introduction to Economics & Management
• A128 Applied Biology
• A129 Physical Science
• T121 Introduction to Tourism

**Year 2 Sustainable Livestock Production Diploma/Degree**

**Semester 1 Modules**
• A211 ICT for Natural Resources
• A212 Applied Mathematics
• A213 Health and Safety at Work
• N211 Introduction to Animal Science
• N213 Anatomy and Physiology of Farmed Animals
• N214 Monogastric Animal Production

**Semester 2 Modules**
• A224 Introduction to Business and Management
• A227 Agricultural Mechanization
• M229 Applied Ecology
• N222 Animal Production Practices
• N225 Ruminant Animal Production
• N226 Pasture Production and Management

**Year 3 Sustainable Livestock Production Degree**

**Semester 1 Modules**
• A311 Statistics
• A313 Work Experience Placement between year 2 & 3
• N311 Animal Nutrition
• N312 Feed Analysis & Instruments
• N313 Animal Health Management
• N314 Extension Methods

**Semester 2 Modules**
• A322 Research Methods
• A326 Farm Business Project
• M321 Aquaculture
• N321 Applied Animal Nutrition
• N323 Animal Behaviour & Welfare
• N324 Meat Quality & Assessment

**Year 4 Sustainable Livestock Production Degree/Honours Degree**

**Semester 1 Modules**
• A411D Industry Project or
• AH411D Research Project I
• A413 Entrepreneurship
• A416 Principles of Food Processing
• N411 Principles of Genetics
• N413 Climate Change & Animal Agriculture

**Semester 2 Modules**
• A422D Current Issues in Natural Resources or
• AH422D Research Project 2
• A423 Marketing Management
• N421 Livestock Integrated Farming System
• N422 Animal Breeding
• N424 Animal Reproduction

**Department of Fisheries and Marine Resource**
Fisheries, the exploitation of living aquatic resources from capture fisheries, recreational fisheries, and aquaculture, make a significant
contribution to the economy of PNG. The Department offers three courses, aimed at ensuring PNG produces graduates with the skills and knowledge required to help lead and manage our fisheries industry sustainably, and carry out research designed to address the problems faced by our modern fisheries industry. The courses offered by the Department of Fisheries and Marine Resource are PNG’s only fully integrated courses of study for students wishing to prepare themselves for a wide range of careers, within both the public and private sectors of the fisheries industry in PNG and the South Pacific Region. These include professional and technical positions in the areas of biological, environmental and economics research, fisheries regulation and management, environmental and resource conservation, aquaculture research, fish farming, fishing gear technology, seafood technology and marketing. Students gain an overall appreciation of all aspects of fisheries research, development and management.

**Advanced Diploma in Sustainable Fisheries and Marine Resources** This course requires three years of full-time study. Students can leave the course with a Diploma after having successfully completed the second year.

**Bachelor’s Degree/Honours Degree in Sustainable Fisheries and Marine Resources** These are four year full time undergraduate courses. Students are selected for entry into the third year of the Degree programme based on their marks in the second year of the Diploma in Fisheries and Marine Resource which must equal or exceed 65%. High achieving students can gain an honours degree after completing a dissertation in year four.

**Degree in Sustainable Fisheries and Marine Resources – Bridging** Students already holding an Advanced (3 year) Diploma in Fisheries and Marine Resources followed by at least a year of industry experience can apply to enter the Bachelor of Sustainable Fisheries and Marine Resources bridging program via direct entry into the fourth year programme for the degree. The module is subject to demand and accommodation space being available. Enrolment is competitive and subject to eligibility conditions.

### Course Structure

#### Year 1 Sustainable Fisheries and Marine Resources Diploma/Degree

**Semester 1 Modules**

- A111 Communication Skills
- A112 Introduction to Biology
- A114 Introduction to Chemistry
- A115 Introduction to Agriculture
- F111 Introduction to Forestry
- M111 Introduction to Fisheries

**Semester 2 Modules**

- A123 Natural Resource Conservation & Utilisation
- A126 On Farm Practice
- A127 Introduction to Economics & Management
- A128 Applied Biology
- A129 Physical Science
- T121 Introduction to Tourism

#### Year 2 Sustainable Fisheries and Marine Resources Diploma/Degree

**Semester 1 Modules**

- A211 ICT for Natural Resources
- A212 Introduction to Aquatic Ecosystems
- A213 Health and Safety at Work
- A216 Introduction to Plant Science
- M211 Biology of Fisheries Resources
- M212 Introduction to Aquatic Ecosystems

**Semester 2 Modules**

- A224 Introduction to Business and Management
- M221 Marine Conservation Biology
- M222 Fishing Operations and Gear Technology
- M223 Introduction to Tropical Seafood
- M224 Intro to Fisheries and Marine Resource Management
- M229 Applied Ecology
Year 3 Sustainable Fisheries and Marine Resources Diploma

**Semester 1 Modules**
- AD311 Statistics
- AD313 Work Experience Placement between year 2 and 3
- MD311 Fisheries Marketing
- MD312 Fisheries observing, monitoring and statistics
- MD313 Freshwater ecology and limnology
- MD314 Small Business Planning

**Semester 2 Modules**
- AD322 Research Methods
- MD321 Aquaculture
- MD322 Tropical seafood science
- MD323 Inland fisheries
- MD324 Fisheries Oceanography
- MD325 Intro climate change impacts to fisheries and aquaculture

Department of Forestry
Forestry, timber harvested from virgin forest or managed plantation, tree crops and non-timber forest products all make a significant contribution to the economy of PNG. A sustainably managed forestry industry has the potential to bring many people into the formal economy. Unsustainably managed it tarnishes PNG’s international reputation, it pollutes rivers, erodes road systems and impairs our ability to generate hydroelectricity. The department offers four courses aimed at producing graduates to manage the forest resource sustainably.

**Advanced Diploma in Sustainable Tropical Forestry** This is a three year full time undergraduate course. Students can leave the course with a Diploma after having successfully completed the second year.

**Degree/Honours Degree in Sustainable Tropical Forestry** This is a four year full time undergraduate course. Students are selected for entry into the third year of the Degree programme based on their marks in the second year of the Diploma in Sustainable Tropical Forestry which must equal or exceed 65%. High achieving students can gain an honours degree after completing a dissertation in year four.
## Course Structure

### Year 1 Sustainable Tropical Forestry
**Diploma/Degree**

**Semester 1 Modules**
- A111 Communication Skills
- A112 Introduction to Biology
- A114 Introduction to Chemistry
- A115 Introduction to Agriculture
- F111 Introduction to Forestry
- M111 Introduction to Fisheries

**Semester 2 Modules**
- A123 Natural Resource Conservation & Utilisation
- A126 On Farm Practice
- A127 Introduction to Economics & Management
- A128 Applied Biology
- T121 Introduction to Tourism

### Year 2 Diploma/Degree Sustainable Tropical Forestry

**Semester 1 Modules**
- A211 ICT for Natural Resources
- A212 Applied Mathematics
- A213 Health and Safety at Work
- A215 Principles of Soil Sciences
- A216 Introduction to Plant Science
- F212 Forest Products and their Utilisation

**Semester 2 Modules**
- A221 Sustainable land use
- A224 Introduction to Business and Management
- A227 Agricultural Mechanisation
- F223 Plantation Forest Silviculture
- F224 Forest Ecology
- M229 Applied Ecology

### Year 3 Diploma Sustainable Tropical Forestry

**Semester 1 Modules**
- AD311 Statistics
- AD313 Work Experience Placement between year 2 & 3
- AD314 Extension Methods
- MD314 Small Business Planning

**Semester 2 Modules**
- A322 Research Methods
- F323 Sustainable Use of NTFP’s
- F324 Sustainable Palm Oil Production
- F325 Environmental Services and Forest Management
- F326 People and Forests
- F327 Natural Forest Silviculture

### Year 3 Degree in Sustainable Tropical Forestry

**Semester 1 Modules**
- A311 Statistics
- A313 Work Experience Placement between year 2 & 3
- A314 Extension Methods
- F311 Forest Inventory and Assessment
- F314 Catchment Management
- M314 Small Business Planning

**Semester 2 Modules**
- A411 Industry Project
- AH411D Research Project I
- A413 Entrepreneurship
- F411 Agroforestry
- F413 Forest Policy
- F414 Forest Economics

### Year 4 Degree/Honours Degree Sustainable Tropical Forestry

**Semester 1 Modules**
- A411D Industry Project or
- AH411D Research Project I
- A413 Entrepreneurship
- F411 Agroforestry
- F413 Forest Policy
- F414 Forest Economics

**Semester 2 Modules**
- A422D Current Issues in Natural Resources or
- AH422D Research Project 2
- A422 Plant Breeding and Biotechnology
Postgraduate (Management) Programme

The Masters in Management Studies course (M.Mgt) is a flexible 18 – 36 month part-time programme, aimed at participants in full-time employment. Participants attend classes on the UNRE ENB campus for one week periods of intensive learning. During this time they are introduced to theory, concepts and contemporary practices and their application to the student’s own work situation. They also develop an action plan to implement a learning project in their workplace or local community. Documentation of this project, together with an exam, makes up the formal assessment of the module. All lectures are conducted by visiting Professors from Universities in Australia and New Zealand.

Programme of Study

<table>
<thead>
<tr>
<th>Core Modules</th>
<th>Electives</th>
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<td>MMS112 Financial Management</td>
<td>MMS114 Operations Management</td>
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<td>MMS121 Leadership &amp; Management</td>
<td>MMS124 Entrepreneurship, Innovation, Change &amp; Development</td>
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<td>MMS122 Project Management</td>
<td>MMS125 Human Resources Management</td>
</tr>
<tr>
<td>MMS100 Project (double module)</td>
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</table>

Master Degree

All five core modules and two electives.

Entry requirement: Bachelor degree and three years professional experience or Grade point average 2 or better from the Graduate Certificate in Management Studies.

Graduate certificate

Any four modules (except MMS100)

Entry requirement: Diploma in a professional discipline and five years work-experience.
SECTION E: MODULE DESCRIPIONS

Modules are described by code in alphabetical order, then numerical order.

A more detailed description of the module, learning outcomes, assessments and suggestions for further reading is available in the Departments on module approval forms (MAFs) and will be available in a module handbook at the start of each semester.

Sustainable Tropical Agriculture
A111 Communication Skills
Module coordinator: Ms Stephanie Tringin
Module description
This module provides training in effective communication by exploring the essential skills of speaking, listening, reading and writing. Students will be given lecture presentations and activities that will improve their skills in each of these areas in order to improve their ability to comprehend and effectively communicate in the modules taught in university and in the workplace. Students will also be given instructions in; word processing (Microsoft Word), slideshow presentation using Microsoft PowerPoint, basic mathematical functions, data compilation and the creation of graphs (using Microsoft Excel).
Learning Outcomes
By the end of the module students will be able to:
1. Demonstrate competency in using;
   • Microsoft PowerPoint as an aid to presentations
   • Microsoft Excel to complete basic mathematical functions, create appropriate graphs and organise data
   • Microsoft Word to produce competent documents
2. Demonstrate a confident approach to public speaking
3. Comprehend (interpret) texts, readings and or questions given in coursework and construct meaningful notes and or answers
4. Write clear scientific reports
5. Consistently apply a Harvard Style of Referencing in report writing.
Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials, seminars or practicals and 60 hours self-study.
Assessment
Coursework 50%: Final examination 50%
Essential reading
Kehatsin, J. (2004), Effective Writing: An Asset for University Students, PNGUNITECH Printer, Lae, PNG

A112 Introduction to Biology
Module coordinator: Mr Nason Pue
Module description
This module aims to teach students how single cells and complex multicellular organisms function. Knowledge gained from this module will be vital for more advanced modules such as animal and crop physiology including plant nutrition, genetics and biotechnology. This module will cover: the biological molecules of life; their structures and functions and the role of water. Cell biology; the two main cell types (prokaryotic and eukaryotic cells), the functions of the different cell components, the differences between cells of bacteria, animals and plants, the cell membrane as the principle of cellular organisation, cell division and cell signalling in the formation of multicellular organs and cellular respiration including fermentation. Genetics; basic Mendelian genetics, gene structure, molecular genetics, replication, transcription and translation. Diversity of living things; classification, evolutionary relationships, morphology, anatomy, reproduction and physiology of animals.
Learning Outcomes
By the end of the module students will be able to:
1. Define the structure and function of a typical eukaryotic and prokaryotic cells
2. Describe the process of cell division in somatic and gamete cells in eukaryotic cells in the context of tissue formation and organ formation in processes involved in growth and development of multicellular organisms specifically animals and plants.

3. Demonstrate basic principles of genetics in the context of predicting outcomes of crosses, gene mutations and its effect on gene expression.

4. Describe the diversity of living things by way of classification, and be able to write scientific names of organisms using the binomial nomenclature

**Module delivery**

100 hours comprising 20 hours lectures, 20 hours tutorials, seminars or practicals and 60 hours self-study.

**Assessment**

Coursework 50%; Final Examination 50%

**Essential reading**


Freeman, S. (2008), Biological Science (3rd edn) Pearson International Edition), Benjamin Cummings, San Francisco

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**A114 Introduction to Chemistry**

*Module coordinator: Dr Cathryn Warren*

**Module description**

An understanding of chemistry is essential to the detailed study of many areas relevant to the study and management of natural resources including oceans, soils, fertilisers, pesticides, herbicides, pollution, food and nutrition. This aim of this module is to ensure that students from different educational backgrounds have the chemical knowledge, and practical expertise required to be successful in their studies. In addition to the subject specific knowledge, this module provides opportunities to develop generic skills, such as communication, team working, numeracy and problem solving. Areas covered include: Atoms, elements, and the periodic table; bonding; chemical calculations; energy and reaction rates; equilibria and acid-base reactions; basic organic chemistry; chemical analysis; biological and geological cycles.

**Learning Outcomes**

By the end of the module students will be able to:

1. Explain the fundamental chemical principles governing chemical reactions. These principles are described in detail in the module handbook.

2. Apply their knowledge to solve chemical problems.

3. Design experiments to investigate the nature of materials.

**Module delivery**

100 hours per semester comprising 10 hours lectures, 20 hours workshops and practical activities and 70 hours self-study.

**Assessment**

Coursework 40%; Final Examination 60%

**Essential Reading List**


**Useful websites:**

www.chemguide.co.uk

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**A115 Introduction to Agriculture**

*Module coordinator: Mr Adolf Wellip*

**Module description**

This module includes a brief history of agriculture in PNG, crop species and the importance of preserving diversity, major food and cash crops, and their domestic and international market potentials. The performance of PNG’s export crops and strategies for improvement. Fishery, aquaculture and forestry resources of PNG and their importance in sustaining livelihoods. The need to transform PNG’s contemporary agriculture systems to increase productivity, and foster sustainability to meet the challenges of population increase and climate change. Gender equality in agriculture. Food security. E-agriculture and its importance to small holder farmers. Factors that impede
agriculture sector’s development and performance in PNG.

Module description
This module covers the important renewable natural resources namely Land, Forestry, Fisheries, Wildlife and Biological Diversity. Topics that relate to the management, conservation and utilisation, and strategies to ensure the sustainability of these renewable natural resources are also covered. Students will investigate the roles and responsibilities of relevant stakeholders - government agencies and institutions, communities, etc. in addressing issues of resource management, utilisation and conservation.

Learning Outcomes
By the end of the module students will be able to:
1. State the important renewable natural resources of the world including Papua New Guinea and their potential benefits to the people.
2. Describe the extent and causes of land degradation in the world and particularly in the Asia/Pacific region including Papua New Guinea.
3. State the importance and current state of the forests, fisheries resources, wildlife resources and biological diversity resources of the world.
4. Describe some of the management and conservation strategies and approaches in relation to the utilisation of land, forestry, fisheries, and wildlife resources.

Module delivery
100 hours per semester comprising 10 hours lectures, 20 hours tutorials and 70 hours self-study.

Assessment
Coursework 50%: Final Examination 50%

Essential Reading

Biodiversity for Food and Agriculture: Contributing to Food Security and Sustainability in a Changing World. Published by FAO of UN as the Platform for agro biodiversity research.

A123 Natural Resource Conservation & Utilisation
Module coordinator: Joachim Pitala

A126 On Farm Practice
Module coordinator: Mr Freddy Gena

Module description
This non-examinable module enables students to visit and work in all sections of the UNRE farm. Through this module the students will recognize, understand and become practically involved with the functions and operations of each section.
Learning Outcomes
By the end of the module students will be able to:
1. Explain the functions of the different forms of local agricultural production
2. Identify the importance of the agricultural activities in producing food
3. Identify the limiting factors to local agricultural production
4. Recommended ways of increase local agricultural productivity without impacting on other industries
5. Perform on farm tasks effectively and on time

Module delivery
100 hours per semester comprising 5 hours lectures, 95 hours field work and self-study.

Assessment
60% report, 40% supervisor assessment

Essential Reading List

A127 Introduction to Economics and Management
Module coordinator: Adolf Wellip

Module Delivery
This module provides an introduction to how economic concepts, principles and laws, are applied in agriculture, fisheries, forestry and other disciplines. This module will enable students to comprehend real world problems and make critical decisions on how to use scarce resources, think systematically about economic problems and achieve business objectives. A basic understanding of economics is a useful tool, in forward planning, understanding market forces, creating opportunities for business enterprise and making daily livelihood decisions.

Learning Outcomes
By the end of the module students will be able to:
1. Explain key concepts, facts, laws and principles, in economics and basic management processes and functions that include leadership styles and theories.
2. Describe the concepts of supply, demand, and price and income elasticity and plot them on the graphs, production frontiers, inflation, gross domestic product and unemployment rate and exchange rates.
3. Produce different organisational charts and identify varied management and leadership styles.
4. Calculate different elasticity, opportunity costs, production costs, GDP, economic growth, inflation, unemployment rate in the economy. Use the different elasticities to explain the processes of production and marketing decisions.

Module delivery
100 hours per semester comprising 20 hours lectures, 20 hours seminars and tutorials and 60 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading List

A128 Applied Biology
Module coordinator Nason Pue

Module description
This module will enable students to identify the diversity of adaptations of anatomical and physiological traits observed in plants and animals that allow them to live in their diverse habitats. The aim is to help students see plants and animals as efficient systems for gathering resources and producing offspring.
The knowledge gained will be useful for advanced studies in animal and plant production systems or for managing wildlife for ecotourism purposes.

The module covers: Plant structure and function; water and sugar transport, soil and plant nutrition, plant reproduction in angiosperms, growth and development and plant sensory systems in response to internal and external signals including infections. Structure and function of the major organ systems in animals; infections, and animal behaviour. Ecology; population ecology, community ecology, ecosystems and biodiversity.

**Learning Outcomes**

By the end of the module students will be able to:

1. Describe the structure and function of plant roots, stems, leaves and flowers
2. Describe the processes of photosynthesis, internal transport and plant reproduction.
3. Describe sensory mechanisms employed by plants to detect and fight plant infections
4. Describe the growth and development stages in plants and animals.
5. Describe the anatomy and physiology of organs and organ systems in animals and how they work including their functional units.
6. Define ecology and describe ecological interactions.

**Module delivery**

100 hours per semester comprising 20 hours lectures, 20 hours seminars, tutorials and practicals and 60 hours self-study.

**Assessment**

Coursework 50%: Exam 50%

**Essential Reading List**


Freeman, S., 2008, Biological Science (3rd edn) Pearson International Edition), Benjamin Cummings, San Francisco

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**A129 Physical Science**

*Module coordinator: Mr Peter Nguna*

*Module description*

This module will enable students to apply physics in their course and later in their professional careers. It introduces students to the principles of measurements, vectors, force and motion, work, energy and power, properties of matter, fluids, temperature and thermometry.

**Learning Outcomes**

By the end of the module students will be able to:

1. List the physical quantities of measurements and their relevant units.
2. Describe the basic principles of applied physics in everyday use in natural resources.
3. Apply physical principles to solve problems in natural resource science.
4. Demonstrate applications of physical principles in natural resource science.

**Module delivery**

100 hours per semester comprising 20 hours lectures, tutorials, practicals and self-study.

**Assessment**

Coursework 50% (tests and lab report): Exam 50%

**Essential Reading List**


Nonie, S.E., Baimba, A.A. (2003), Concise College Physics, Volume 1, CBS Publishers & Distributors, PVT. LTD, India

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**A211 ICT for Natural resources**

*Module coordinator: Mr Russell Deka Harada*

*Module description*

This module introduces the importance of ICT for Natural Resources to all second year UNRE students. It will enable students to use ICT as tools for data storage, communication, research and other academic activities. The module is designed to provide an understanding of the basic ICT skills, including; internet literacy and research, e-mail and other online communication/collaboration (SNS), PC
trouble-shooting/maintenance, data protection, data manipulation/management.

**Learning Outcomes**
By the end of the module students will be able to:
1. Download data in a range of formats of data using internet search tools and manipulate and present the data in a clear helpful way
2. Use a range of software to analyze data
3. Select appropriate software for range of different tasks.
4. Communicate effectively with individuals and groups using a range of digital IT platforms
5. Use technology effectively in the delivery of instruction, assessment and professional development with ICT

**Problem solving**

**Module delivery**
100 hours comprising 10 hours lectures, 30 hours tutorials and practicals, and 60 hours self-study.

**Assessment**
Coursework 80% (Assignment and practical activity): Final Examination 20%

**Essential Reading**
https://www.internetsociety.org/sites/default/files/Brief_History_of_the_Internet.pdf
https://www.forbes.com/sites/gilpress/2013/04/08/a-very-short-history-of-information-technology-it/#6f1c1bde2440
Cheltenham Office 2010 Courseware

**A 212 Applied Mathematics**
**Module coordinator: Mr Nason Pue**

**Module description**
This module aims to teach students how to apply mathematical concepts and relationships to solve real world problems. For example, modelling population growth of microorganisms, animals or plants or the growth of the economy, interest rates, costings in businesses etc. to describe the changes as well as predict expected outcomes for decision making.

**Learning Outcomes**
By the end of the module students will be able to:
1. Use descriptive statistics to summarise data in a clear way
2. Select the appropriate graph format to represent a range data sets
3. Apply basic statistics to test if data sets differ from each other
4. Formulate practical problems as mathematical functions and solve them
5. Use linear regression and goodness of fit to make predictions

**Module delivery**
100 hours comprising 20 hours lectures, 20 hours tutorials and seminars and 60 hours self-study.

**Assessment**
Coursework 60%: Examination 40%

**Essential Reading**
https://elearningindustry.com/

**A213 Health and Safety**
**Module coordinator: Mr Aisak Pue**

**Module Description**
The principles and practice of Health and Safety are crucial for anyone working in agriculture, forestry, fisheries or tourism. Agriculture, forestry and fisheries are particularly high risk industries. By the end of this module students will be able to assess risks and work safely in the laboratory, field and workplace. This will enable students to be safety conscious in their current programme and later in their professional careers either as employees or as employers.
This module will enable students to appreciate biological, physical and chemical health and safety risks. How to prevent them and what to do in an emergency situation.

**Learning Outcomes**
By the end of the module students will be able to:
1. Demonstrate an informed opinion on the importance of Health and Safety in the workplace
2. Prepare risk assessments for a variety of different situations, including recommendations for the use of PPE, and appropriate procedures for emergency situations.

3. Outline current Health and safety regulations, and consider ethical obligations where regulations do not exist.

4. Carry out basic first aid.

5. Recognise the importance of factors affecting general health such as welfare, nutrition and fitness

Module Delivery
100 hours including 20 hours lectures, 10 hours tutorials and practicals and 70 hours self-study.

Assessment
Coursework 50%: Examination 50%.

Essential Reading

A215 Principles of Soil Science
Module coordinator: Mr James Aipa
Module description
A knowledge of soils is vital for farmers, agronomists, and soil scientists to manage soil resources wisely. Rapid increases in population exert a huge pressure on existing croplands. Croplands are diminishing in size and forest lands are declining due to agricultural expansion. Natural disasters such as floods and earthquakes coupled with anthropogenic activities like agriculture and mining are responsible for degradation of existing croplands. This module introduces students to the importance of soils and the study of soil formation, land use mapping and classification. The later part of this module deals with the chemistry of soils and plant nutrient management and sustainability of agricultural production in Papua New Guinea.

Learning Outcomes
By the end of the module students will be able to:

1. Understand the role of soils and how they are formed and discuss the major soil groups in Papua New Guinea.

2. Discuss key soil properties (physical, chemical and biological) and explain how these properties determine soil quality and suitability for plant growth.

3. Implement field studies and explain strategies for soil improvement, including crop rotation, land falls, shifting cultivation, organic matter application, cover cropping, green manuring, mulching, agri-forestry and composting.

4. Identify important soil processes and their influence on soil behaviour.

5. Carry out soil sampling; take soil samples and perform laboratory tests on soils, interpret results and make appropriate recommendations.

Module delivery
100 hours comprising 20 hours lectures, 45 hours tutorials, practical activities, field visits and 35 hours self-study.

Assessment
Coursework 50%: Examination 50%.

Essential Reading

A216 Introduction to Plant Science
Module coordinator: Mr Inia Bunsa
Module description
This module is an introduction to the basic principles of plant growth and development in crop production. It is a practically oriented and aims to teach students the correct
practices involved in plant or crop production. These factors include; site selection, land clearing and soil cultivation, plant reproductive growth and development, plant propagation techniques, plant establishment, crop management practices, plant maturity, harvesting and storage. Students are given practical projects in order to increase their understanding of practical applications and to build interest and motivation.

Learning Outcomes
By the end of the module students will be able to:
1. Explain the various factors that influence plant growth, development and production.
2. Describe the different growth, development and production stages of plants from the nursery stage to field planting, harvesting and storage.
3. Describe the various plant propagation techniques and explain the usefulness of each method.
4. Explain the importance and benefits of good crop management practices and apply them correctly to suit each crop genotype in the growth and development stages.
5. Discuss pre-harvest and post-harvest techniques involved in crop production.

Module delivery
100 hours comprising 24 hours lectures, tutorials and practical activities and 56 hours self-study.

Assessment
Coursework 50%; Examination 50%

Essential Reading


A221 Sustainable Land Use and Management
Module coordinator: Mr James Aipa
Module description
This module explores important natural resources including soils, forests, grasslands, swamps, rivers and lakes, main landforms of PNG and their influences on sustainable land use. The module will challenge students to apply the concepts of sustainability rigorously when considering land management, drawing on examples from the rural environment and land reclamation associated with industrial use or mineral extraction.

Learning Outcomes
By the end of the module students will be able to:
1. Describe the nature and importance of sustainable land use and management for sustainability of forestry/agricultural systems.
2. Evaluate ways in which forestry/agricultural practices can alter the environment.
3. Analyse forestry/agricultural farming practices and assess land management options so as to utilise site resources to optimise impacts with regard to economic, social and environmental outcomes.
4. Evaluate the negative effects of forestry/agricultural processes on sustainability and devise suitable strategies to rehabilitate degraded soils using case studies of sustainable land use studies elsewhere around the world.
5. Develop appropriate skills and strategies for soil improvement including crop rotation, shifting cultivation, mulching, organic matter application, agro-forestry, green manuring, cover cropping, land fallows and composting for agricultural/forest soil management and planning.

Module delivery
100 hours comprising 20 hours lectures, 40 hours tutorials, practicals and field visits, and 40 hours self-study.
Assessment
Coursework 40%: Examination 60%.

Essential Reading
Khan, T. O., Soil Degradation, Conservation and Remediation, Springer

A224 Introduction to Business and Management
Module coordinator: Mr Adolf Wellip
Module description
This module introduces students to farm management functions, processes and record keeping systems enabling them to make good financial investment decisions, assess the performances of enterprises and make investment decisions to improve enterprise performance.
Learning Outcomes
By the end of the module students will be able to:
1. Explain key business and management concepts, theories, functions, principles and terms.
2. Assess the business environment and choose the ideal enterprise for the environment and resources available and produce a business plan.
3. Make investment decisions based on the financial statements, evaluate and analyse business management decisions.
4. Use the business plan and produce different financial statements to help choose the most profitable enterprise and make financially sound business investment decisions.

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials and 60 hours self-study.
Assessment
Coursework 50%: Examination 50%.

Essential Reading

A227 Agriculture Mechanisation
Module coordinator: Mr Robert Bola
Module description
Current technological advances have given developed nations very sophisticated field equipment which in turn demands a high level of training for managers and operators. UNRE students need the skills to manage imported farm technology. Students must evaluate the limitations of mechanization so they can either employ or modify the design appropriately for industry and farming in PNG. Students also need to know the different sources of energy required to power agricultural machines. This module will lead students to critically weigh the advantages and disadvantages of mechanization as it impacts PNG as a developing nation. Students are encouraged to investigate advances in technology that are currently employed by big agro-business in the country such as Ramu Sugar Industries, New Britain Palm Oil Limited, PNG Balsa and Hagi Oil Palm Limited.
Learning Outcomes
By the end of the module students will be able to:
1. Describe the functions of parts, devices, units and systems of the tractors internal combustion engine.
2. Discuss the action, operation and objectives of farm machines including tillage implements, planting equipment, pesticide and fertilizer applicators, and harvesting equipment.
3. Describe crop planting patterns and discuss the operational and functional requirements of planting equipment to achieve these patterns.
4. Discuss the application of precision farming tools in agricultural activities.
5. Demonstrate competency in performing calculations in relation to machinery costs and calibrations.

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials and practicals, and 60 hours self-study.

Assessment
Coursework 40% Examination 60%.

Essential Reading

A228 Agricultural Protection
Module coordinator: TBA
Module description
The world has a growing need for sustainable food production. For many thousands of years humans have been in a struggle to protect our food supply from other species that may also exploit of food. All agriculturalists need an understanding of how farmers protect their crops and livestock from disease and other pest species. This module covers both the underlying theory and practice that is vital if we are to increase yields in challenging tropical conditions.

Learning Outcomes
By the end of the module students will be able to:
1. Describe the main ecological features of pest species
2. Compare and contrast the effectiveness of biological and chemical control of agricultural pests.
3. Compare and contrast the history of the development of biological and chemical control of agricultural pests.

4. Compare and contrast the environmental impacts associated with biological and chemical control of agricultural pests.
5. Be aware of potential future developments in agricultural protection science.

Module delivery
100 hours comprising 20 hours lectures, 15 hours practicals, and 65 hours self-study.

Assessment
Coursework 50%: Examination 50%

Essential reading

A(D)311 – Statistics
Module coordinator: Betty Kenny
Module description
This module is focused on the principles of statistics including: distribution patterns in data, descriptive statistics, hypothesis testing and the concept of statistical significance. The module is designed to enable students to select appropriate statistical tests for different types of data. Data handling and the interpretation and presentation of the results of statistical tests are also covered. The module also is also designed to allow students to develop skills in communication, team working, numeracy and problem solving. It is important that UNRE graduates have the ability to perform a range of statistics test, so that they can determine if treatments applied are actually having the effects they expected. It is also important that they can judge if the statistics used by others are valid or not.

Learning Outcomes
By the end of the module students will be able to:
1. Select the appropriate statistical tests for a range of data sets.
2. Correctly perform a range of parametric and non-parametric statistical tests.
3. Correctly interpret the results of a range of statistical tests.
Module delivery
100 hours comprising 20 hours lectures, 28 hours tutorials and six practicals and 52 hours self-study.

Assessment
Exam 100%

Essential Reading

A(D)312 – Applied Rural Technology
Module coordinator: Robert Bola
Module Description
This module teaches students to develop functional, low-cost rural structures using a maximum of locally available building materials and skills. Students will learn how to orientate farmstead structures to suit local environmental conditions. The module teaches traditional surveying techniques, drawing and mapping skills and familiarizes students with the use of satellite technology and computers in the planning phase of projects.

Students will be taught the basic principles for selection of equipment, structural design and construction of agricultural structures, and how to modify building environments to suit agricultural food storage, postharvest processing activities and animal husbandry.

Learning Outcomes
By the end of the module students will be able to:
1. Outline the steps for planning and construction of structures for farming purposes.
2. Apply GPS, GIS and RS in agriculture field management and planning.
3. Develop building enclosures for storage, drying or cooling of produce and for animal husbandry.
4. Determine water requirements for farming.
5. Determine electricity requirements for farm buildings.

Module delivery
100 hours comprising 10 hours lectures, 20 hours tutorials and practicals and 70 hours self-study.

Assessment
Coursework 40%; Exam 60%

Essential Reading
https://elearningindustry.com/

A(D)313 Work Experience
Module coordinator: Inia Bunsa
Module delivery
In this module students develop industrial skills and workplace experience before graduating and going into the real working environment in organizations and industries. Students learn by practical application and involvement in all activities within the organisation or industry they are engaged with. They are sent out to various organizations and industries for a period of six weeks to experience the working environment during the break between years two and three.

Learning Outcomes
By the end of the module students will be able to:
1. Reflect on their experience in a professional working environment.
2. Develop relevant industry and organizational skills.
3. Prepare a job application and resume.

Module delivery
5 hours lectures, 6 weeks work experience and self-study (95 hours min).

Assessment
Coursework 100% (Report and field supervisor’s assessment)
Essential Reading
https://www.entrepreneur.com/article/25011
4 - Elements of a strong work ethic – Entrepreneur.
https://www.thebalance.com – Application Tips, How to write a Job Application.
www.wikihow.com/Make a Resume - How to Make a Resume – Complete Guide.

A(D)314 Extension Methods
Module coordinator: Mr Thomas Suri Taisa
Module delivery
Transfer of scientifically proven knowledge to the farming community is very important in any research and development program. This module identifies knowledge gaps and delivers basic principles and concepts of delivering correct information to the farming community to improve and expand farming systems, increase food production and sustain livelihood. Students will be taught specific approaches and information delivery methods to enrich farming practices that will impact on farmers’ standard of living, food security and economy. The module covers defining agricultural extension, evolution of agriculture extension & rural development, ethics in farming and extension, extension methods/concepts, planning extension programmes, extension assessment & evaluation, farmer participation, and managing extension programmes.

Learning Outcomes
By the end of the module students will be able to:
1. Describe and explain the needs of farmers and extension advisors.
2. Discuss ways of delivering farm information.
3. Describe skills and techniques used in planning and managing extension programs.

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials and 60 hours self-study.
Assessment
Coursework 40%; Exam 60%

Essential Reading

A(D)315D Crop Nutrition and Agronomy
Module coordinator: Joachim Pitala
Module description
Providing essential nutrients to increase yields is important in the management of food and export crops.
This module covers factors controlling the growth of plants such as light, air, water and nutrition, and different nutrient x environmental interactions, nutrients movements from soil to roots, such as mass-flow and diffusion, and factors affecting nutrients availability to plants, ion absorption by plants, passive and active ion uptake in plants, nutrients movement in the xylem and phloem systems, circulation and remobilization of mineral nutrients in plants.
The module also covers the 17 essential individual plant nutrients, their availability and effects on plant growth and development. The module looks at current world trends in relation to fertiliser demand and use in food production, their impacts on the environment and their proper use in terms of sustainability.

Learning Outcomes
By the end of the module students will be able to:
1. Explain the major factors and interactions that influence plant growth and development.
2. Describe the physiology of crop plants
3. Describe the processes of ion uptake into the root system, nutrient pathways to the root, xylem and phloem systems.
4. Describe and explain the macro- and micro- plant nutrients, their different forms in soils and plants, and the principal functions they perform in plants.
5. Calculate fertiliser rates and nutrients requirements for crops.
Module delivery
200 hours comprising 40 hours lectures, 39 hours tutorials, and field visits and 121 hours self-study.

Assessment
Degree Coursework 50%: Exam 50%
Diploma Coursework 60%: Exam 40%

Essential Reading

A322 Research Methods
Module coordinator: Prof. John Warren
Module description
It is vital that all science graduates have an understanding of experimental design and their limitations. This enables them to be critical of published science and reports.
This module is designed to prepare all UNRE graduates to successfully complete a research project in their final year. The module covers the basics of experimental design including: framing answerable research questions, the need for replication, the use of blocks, Latin squares and split plots, controlling variables, dealing with variation in data sets, the need for good experimental techniques, confounding, pseudo-replication, repeat measures, first and second order errors, bias and double blind trials.

Learning Outcomes
By the end of the module students will be able to:
1. Write clear answerable research questions.
2. Produce a critique of good and bad research designs.
3. Produce a review of the literature to inform a research project.
4. Carry out a literature review to answer a research question.

5. Design an original research project.

Module delivery
100 hours comprising 10 hours lectures, 10 hours seminars, 6 hours supervisor meetings and project fair and 74 hours self-study.

Assessment
Coursework 100%: Critique of scientific papers (30%), Literature review and research proposal (70%).

Essential Reading
Montgomery, D.C. (2001), Design and analysis of experiments, John Wiley & Sons
Clarke, G.M. (1994), Statistics and experimental design; an introduction for biologists and biochemists, John Wiley & Sons
Thomas, G. (2013), How to Do Your Research Project, Sage Publications Ltd.

A(D)323 Crop Production
Module coordinator: Mr Inia Bunsa
Agriculture is the mainstay of rural people’s livelihood and the country’s economy, supporting 80% of the population. This module introduces students to the vulnerability of local food production. It includes agronomy and correct production practices of all the staple food crops grown in PNG (root and tuber crops, grains, legumes, brassicas, cucurbits and solanaceous crops). Also agronomy and production of the major perennial (cash) crops grown in PNG (cocoa, coffee, tea, rubber, oil palm and coconut).

Learning Outcomes
By the end of the module students will be able to:
1. Discuss the major social, economic and production constraints limiting production of field and cash crops in PNG.
2. Describe the cultural and management principles used in the production of field crops, including origin and distribution, botanical characteristics, climatic and soil requirements, propagation, field/cultural management (nursery to field, fertilisation, control of weeds, pests and diseases), maturity and harvesting, processing and storage, and future prospects in PNG.
3. Identify and gain a thorough knowledge of the current methods and management principles used in the production of perennial crops, including origin and distribution, botanical characteristics, climatic and soil requirements, propagation, field/cultural management (nursery to field, fertilisation, and control of weeds, pests and diseases), maturity and harvesting, processing and storage, future prospects in PNG.

4. Describe the effects of climate change under different scenarios, i.e. field and perennial crop production under current management systems and develop suitable strategies to improve production of a crop species.

Module delivery
100 hours comprising 20 hours lectures, 40 hours tutorials, practical activities, field visits and 40 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading


A(D)325 Applied Entomology
Module coordinator: TBA

Module description
Insects have a major impact on the ecology and economy of the world. The great diversity of insect form and function means their impact on human populations and activities can be beneficial or detrimental. During this module the student will explore the complex interactions between insects and humans. For example insect pollinators provide an important service to plants, which in turn results in fruit, nuts and seed of vital nutritional importance to humans. On the other hand, insect pests of crops and livestock can significantly reduce food production, and insect vectors of disease play an important role in spread of pathogens.

Learning Outcomes
By the end of the module students will be able to:
1. Illustrate the diversity of insect function.
2. Describe how insects interact with humans in a variety of beneficial and detrimental ways.
3. Explain how insects are monitored and managed in a human-dominated environment.
4. Describe the principles of insect ecology and evolution.

Module delivery
100 hours comprising 20 hours lectures, 15 hours practicals, and 65 hours self-study

Assessment
Degree Coursework 60%: Exam 40%
Diploma Coursework 50%: Exam 50%

Essential Reading


A(D)326 Farm Business Projects
Module coordinator: Mr Peter Navus

Module description
This module will be delivered by a lecturer assisted by mentors. This project covers two semesters. Each student will become a member of a small business group. Each group will establish and manage a small agricultural business within a given timeframe. The module allows students to plan, organize and manage their business in the real farming environment. The resources provided to each group by the University include plot of land, capital (loan), labour, information, management skills and time.

Learning Outcomes
By the end of the module students will be able to:
1. Develop a business plan and report on its success or failure.
2. Plan and establish a small agricultural business involving a small group of members with a common interest.
3. Organize the operation of a small farm business, from production through to marketing and declare a profit or loss.

**Module delivery**
100 hours comprising 10 hours lectures, 20 hours tutorials and 70 hours self-study

**Assessment**
Degree: Coursework 70%: Exam 30%
Diploma: Coursework 100%

**Essential Reading**

**A411D Industry Project (Degree)**

*Module coordinator: Dorothy Worogop*

**Module description**
This module is based around relevant work experience between years three and four followed by reflection and analysis of the work placement on return to University in year four. Lecture material covers, writing a Curriculum Vitae, applying for jobs, realistic aspirations, preparing for interviews, time management, workplace discipline, giving and receiving clear instructions and problem solving in the work environment. Students are given an opportunity to apply knowledge in the field. They learn research skills, gain industry experience and understand work ethics.

**Learning Outcomes.**
By the end of the module students will be able to:
1. Produce an attractive accurate Curriculum vitae.
2. Complete an application for an appropriate job in a relevant industry.
3. Reflect on the workplace experience and identify strengths and weaknesses.
4. Produce a report on an industry related project.

**AH411D Research Projects 1 (Honours degree)**

*Module coordinator: Lloyd Werry*

**Module description**
Being able to successfully carry out a research project is an essential requirement of an honours degree. This is a student centred module where students carry out their own research project designed previously in the year 3 research methods module. They are closely supervised by an academic member of staff, but are responsible for the project management and data collection during this module.

**Learning Outcomes.**
By the end of the module students will be able to:
1. Carry out independent research work in natural resources
2. Demonstrate research management skills
3. Deliver a public oral presentation to the university based on their research

**Module delivery**
200 hours comprising two lectures, supervisions and independent research.

**Assessment**
Coursework 100% (Lab book reviews, public seminar).
**Essential Reading**
Montgomery, D. C., (2001), Design and analysis of experiments, John Wiley & Sons
Clarke, G.M. (1994), Statistics and experimental design; an introduction for biologists and biochemists, John Wiley & Sons
Thomas, G. (2013), How to Do Your Research Project, Sage Publications Ltd.

**A413 Entrepreneurship**
*Module coordinator: Stephanie Tringin*

**Module description**
It is important that students recognize the importance of creating jobs and businesses in PNG as the current job market may not be able to employ all students upon graduation. This module aims to introduce students to the concept of entrepreneurship. It will explore entrepreneurial behaviour, successful initiatives and entrepreneurship frameworks. The content will be written encompassing the Small Medium Enterprises Act as the PNG Governments vehicle for wealth creation for the populace. It will be delivered via a series of presentations, a Credit Sourcing Seminar, videos and coursework that will guide students through the following; Starting up and registering a business in PNG through the Investment Promotion Authority. Acquiring tax identification. Finding investors and start-up funding. Sourcing Credit and Screening Tips from Credit Providers. Innovation and what makes an entrepreneur. Social responsibilities of entrepreneurs. Risk analysis and dealing with failure.

**Learning Outcomes.**
By the end of this module students will be able to:
1. Write a small business proposal
2. Identify the processes and requirements necessary when
   (i) applying for a business loan and
   (ii) acquiring tax identification for small businesses in PNG
3. Identify the role of the entrepreneur in developing a successful new business ideas
4. Critically compare successful and failed local enterprises

**Module delivery**
100 hours comprising 6 hours lectures, 14 hours seminars and 80 hours self-study.

**Assessment**
Coursework 100%

**Essential Reading**

**A414 Resource Management**
*Module coordinator: Peter Navu*

**Module description**
This module covers the management of resources in PNG. It teaches students to make sound decisions based on management skills and policy information linked with investments of capital, land and human resources. It covers the policies that are critical in relation to natural resource based business as guided by; gender, environment, HIV/AIDS and the uniqueness of PNG society. Visits to business organizations representatives and agents will be used to complement the activities provided by the University farm

**Learning Outcomes.**
By the end of this module students will be able to:
1. Apply principles of sound decision making based on good policy.
2. Use models, policy and technology effectively in the delivery of instruction, assessment, and professional development.
3. Evaluate the need for resources and the correct management skills and tools needed to make decisions.
4. Articulate cultural and socioeconomic differences and the significance of these
differences for instructional planning in managing their resources.

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials and 60 hours self-study.

Assessment
Coursework 40%; Exam 60%

Essential Reading

A416 Principles of food processing

Module coordinator: Mr Peter Nguna

Module description
Losses along the food chain can be minimised through food processing. In this module students learn and practice the principles of processing, preservation and quality control of agricultural produce to alleviate food security problems and loss of agricultural produce.

Learning Outcomes.
By the end of this module students will be able to:
1. Describe food processing technology and its effects on food nutrients and non-nutrient components.
2. Outline different production systems to preserve food and prevent losses.
3. Discriminate between processing technologies for different foods to safeguard food quality and food security.
4. Illustrate the importance of food hygiene and sanitation in food processing and preparation.
5. Appreciate food processing facilities and food quality assurance systems as integral to food processing.

Module delivery
100 hours comprising 20 hours lectures, 22 hours tutorials, practicals and field visits and 58 hours self-study.

Assessment
Coursework 50%; Exam 50%

Essential Reading


A421 Plant Breeding Biotechnology

Module coordinator: Ms Betty Kenny

Module description
Food security is a global issue of concern. Unless we produce graduates with the skills to improve crop genetics, future generations may face dire consequences. This module is designed to provide a solid grounding in the concepts and principles of Mendelian genetics, molecular genetics, quantitative genetics, population and evolutionary genetics; and how these can be applied to theory and practice of modern breeding including applications in biotechnology and genetic resource conservation.

Learning Outcomes.
By the end of this module students will be able to:
1. Design and justify an appropriate sampling strategy to establish a germplasm collection
2. Compare and contrast the way new crop varieties are produced in species with different reproductive systems.
3. Analyse a progeny trait dataset and explain the decision making processes for progeny selection
4. Critically evaluate different a range of techniques that are available to the modern plant breeder

Module delivery
100 hours comprising 20 hours lectures, 28 hours tutorials and practicals and 52 hours self-study.

Assessment
Coursework 40%; Exam 60%

Essential Reading
Purohit, S. (2002), Biotechnology: Fundamentals and Applications (3rd edn), Agrobios, India
A422D Current Issues in Natural Resources

Module coordinator: Ms Dorothy Worogop

Module description
This module is designed to introduce students to rapidly changing and possibly controversial aspects of their degree subjects. It is designed to ensure that they are up to date with their discipline area. The exact content will be degree subject specific. Students will be taught techniques for data searching and identifying reliable sources, but also to think critically.

Learning Outcomes.
By the end of this module students will be able to:
1. Identify relevant recent sources of information.
2. Critically review the literature.
3. Express views and discuss issues in an appropriate writing style.
4. Synthesise complex topics to produce a balanced summary of current thinking.

Module delivery
200 hours comprising 10 hours lectures, 20 hours tutorials and 170 hours self-study.

Assessment
Coursework 100%

Essential Reading
Materials will be recommended/provided by supervisor based on the topic and will include the most recent online journal publications.

AH422D Individual Projects II (Honours Degree)

Module coordinator: Mr Thomas Suri Taisa

Module description
The production of a final year individual research based dissertation is the mark of an honours graduate. This module is therefore a must pass module for all honours graduates in all our subject areas. The module continues from AH411D Individual Project I of first semester and involves conducting a research experiment including data collection, summarising, and analysing. Results are reported and documented in a research report –Dissertation.

Learning Outcomes.
By the end of this module students will be able to:
1. Critically review the functions performed by the marketing system
2. Apply the marketing principles, concepts and practices to a range of possible SMEs
3. Compare and contrast the local and international markets for a named regional product
4. Compare and contrast legislation which regulates marketing inside and outside of PNG
5. Review the organisations that exist in PNG to market various industries

A423 Marketing Management

Module coordinator: George Korowi

Module description
This module covers topics in Agriculture and Fisheries marketing and management as well as business. It aims to teach students to explain key marketing issues and concerns, and provides an understanding of economic concepts that can be employed for analysing issues in marketing.

Learning Outcomes.
By the end of this module students will be able to:
1. Critically review the functions performed by the marketing system
2. Apply the marketing principles, concepts and practices to a range of possible SMEs
3. Compare and contrast the local and international markets for a named regional product
4. Compare and contrast legislation which regulates marketing inside and outside of PNG
5. Review the organisations that exist in PNG to market various industries
Module delivery
100 hours comprising 20 hours lectures, 12 hours seminars and tutorials, and 68 hours self-study.

Assessment
Coursework 40%: Exam 60%

Essential Reading

A425 Plant Pathology
Module coordinator: TBA
Module description
Pathogens are responsible for causing serious economic losses to crops throughout the world. This module aims to provide information about the biology of major groups of disease causing organisms, to introduce the processes that control infection development and to review the control options available to farmers and growers. The module considers both the basic and applied aspects of plant pathology. It introduces plant diseases, then considers how pathogens attack plants, how plants resist attack, how disease epidemics develop and how they can be described quantitatively and predicted, and how diseases are controlled. It shows how our current knowledge of plant pathology has drawn upon a wide range of research methods from disparate disciplines.

Learning Outcomes.
By the end of this module students will be able to:
1. Describe the biology of plant-pathogenic viruses, bacteria, fungi, oomycetes and nematodes and plant-feeding insects
2. Illustrate the morphology, classification, reproduction, mode of dispersal, growth, and development of the various pathogens and pest organisms,
3. Describe the life cycles of plant-pathogenic viruses, bacteria, fungi, oomycetes, nematodes and arthropod pests in relation to their interaction with host plant(s),
4. Assess the potential positive and negative effects of disease and pest control measures; - be able to recognize disease symptoms and to assign the causal agent on plants, based on macroscopic and microscopic observations;
5. recognize the most important diseases and pests in crops,
6. Plan a pathogen control strategy

Module delivery
100 hours comprising 20 hours lectures, 15 hours practicals and 65 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading
Virus Diseases of Tropical and Subtropical Crops (2015), CABI Plant Protection Series

Sustainable Tropical Forestry
F111 Introduction to Forestry
Module coordinator: Mr Leo Dawson
Module description
This module introduces the importance of forests and trees to ALL first year UNRE students. Tourism students will appreciate the importance of forests in the landscape and in supporting our rich biodiversity and culture. Fisheries students will understand the importance of forests to the water cycle and thus in the ecology of fish stocks. Agriculturalists and Animal Scientists will understand the role of trees in soil development and in the carbon and nutrient cycles, and the module will form the foundation for future modules for Forestry students.

The module introduces some of the basic aspects of forestry, including: The main types of forests and their commercial, cultural, ecological and landscape values. Forest products, NTFP’s, tourism and ecosystem services. Forest effects on climate and the water cycle. Forest ecology, pests, diseases and other biodiversity. Principles of
Silviculture; nurseries, interventions, harvesting.

**Learning Outcomes**

By the end of the module students will be able to:

1. Identify the main products of forestry
2. Describe the value of trees and forests to other industries in the region
3. Illustrate a broad understanding of silvicultural principles
4. Broadly describe the importance of forests to climate, soil fertility, and biodiversity

**Module delivery**

100 hours per semester comprising 20 hours lectures, 15 hours practicals and 65 hours self-study.

**Assessment**

Coursework 70%: Exam 30%

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**F212 Forest Products and their Utilisation**

*Module coordinator: Mr Leo Dawson*

**Module description**

This module introduces students to the principle products of forestry, how they are processed, marketed, and utilised in their end form. It covers: Wood anatomy, wood structure, relevance to wood products, wood processing technology. PNG processing, wood products, product pricing. The impact of forest type and management on wood properties. The impacts of disease or fungi on wood properties. Species suitability for end-product use. Non-timber products.

**Learning Outcomes.**

By the end of the module students will be able to:

1. Describe the key differences in timber products, and how wood structure is relevant to different processing methods.

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**F223 Plantation Forest Silviculture**

*Module coordinator: TBA*

**Module description**

This module develops understanding of the principles of plantation silviculture as an economic enterprise and its implications in the timber industry. Students are taught to utilise their developing understanding of plantation silviculture as a tool for reforestation. The silviculture of individual tree species and the market demand for standardised forest production methods and produce is covered. The ecological and economic implications of single-species plantation forestry is described.

The module includes: The principles of management in planted commercial forests. Stock selection, seed collection and handling, nursery systems (seedlings and clonal), Plantation planning, establishment, maintenance, harvest and post-harvest management. Stand dynamics, tree
interactions and growth. Disease and insect pest issues. Other damage agents such as fire and wind. Post-harvest restoration and regeneration
Site, soil assessment and species choice.

Learning Outcomes.

By the end of the module students will be able to:
1. Describe the main components of plantation silviculture
2. Determine a suitable approach to plantation establishment based on sound knowledge of site-specific and silvicultural factors.
3. List the main processes involved in nursery production systems and describe their relevance to plantation establishment.
4. Compare the ecological impacts of plantation silviculture and natural forest silviculture.
5. Develop a reasoned argument for plantation forestry in the context of development.

Module delivery
100 hours comprising 20 hours lectures, 15 hours practicals, and 65 hours self-study.

Assessment
Coursework 70%; Exam 30%

Essential Reading
Plantations in tropical and subtropical regions: mixed or pure
Matching trees and sites
Longman, K. A., Preparing to plant tropical trees.

F224 Forest Ecology
Module coordinator: Mr Leo Dawson

Module description
This module equips students with an understanding of the complex ecological interactions that occur within a wide range of natural and managed woodland communities.
For the forestry industry to be sustainable within the region it needs to be aware of the ecological background to forest management and sustainable development of the forest sector. The module includes: The main types of forests found in different regions of the world. World forest resources. The importance of tropical forests (carbon storage, climate control, livelihoods, economics, biological diversity, soil security). The characteristics, and classification of tropical forests (including mangroves). Forest soils. Nutrient and water cycles in forest ecosystems. Carbon storage and sequestration. The difference between natural, semi-natural and plantation forests, and their respective influence on ecological considerations. Key differences between tropical and temperate forest ecologies. Species interactions; pollinators, seed ecology and dispersal agents, keystone species dynamics and their influence. Fungal pathogens, symbionts and endophytes.

Learning Outcomes.

By the end of the module students will be able to:
1. Describe the world’s main forest types
2. Discuss the factors which influence forest growth and regeneration.
3. Identify the main components of the nutrient and water cycles in forests.
4. Describe the main ecological differences between natural, semi-natural, and plantation forests.
5. Critically assess the ecological value of the global forest resource.

Module delivery
100 hours comprising 20 hours lectures, tutorials, 15 hours practicals and self-study.

Assessment
Coursework 50% (Practical reports): Exam 50%

Essential Reading
Montagini, F. & Jordan, C. F., Tropical Forest Ecology; The Basis for Conservation and Management
D'Silva, E., Forestry management for sustainable development. E. D'Silva.
Richards, F. W., The tropical rainforest: an ecological study.
Physiological Ecology of Tropical Plants, Ulrich Lütte Lèuttge, Ulrich.
F(D)311 Forest Inventory and Assessment

*Module coordinator: TBA*

**Module description**
The ability to assess the forest resource using established methodologies and translate assessments into projections of sustainable yield is a vital component of forestry.


**Learning Outcomes.**
1. Recognise the fundamental importance of assessment, inventory and monitoring with respect to forest resource management.
2. Carry out a forest inventory.
3. Apply a sampling system commonly used in forest inventory.
4. Demonstrate an appreciation of the importance of monitoring forest resources.
5. Incorporate variation in the forest resource in the process of forest inventory.

**Module delivery**
100 hours comprising 20 hours lectures, tutorials, 15 hours practicals and self-study.

**Assessment**
Coursework 50%; Exam 50%

**Essential Reading**
West, P. W., Tree and Forest Measurement

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F(D)314 Catchment Management

*Module coordinator: TBA*

**Module description**
This module covers the impact of various forms of land management (particularly forestry) on water catchment management. A sustainable supply of water is essential for many human activities. It is therefore important that graduates understand the importance of various farming and forestry practices on water quality and security of supply. The module includes: The principles of hydrology and the water cycle. Meteorology and patterns of local rainfall. Definitions of a catchment and the relationship to forestry and agriculture. Fundamental freshwater ecology, mangrove ecosystems, and mitigation of pollutants. The impact of land-use management on water production (quality and quantity). Natural flood management methods; influencing flow, leaky woody dams and floodwater retention. Point source and diffuse pollution; mitigation and monitoring.

**Learning Outcomes.**
By the end of the module students will be able to:
1. Critically compare the impacts of different forestry systems on the water catchment.
2. Determine the effect of positive and negative land management in catchments.
3. Describe the impact of turbidity and pollution on freshwater ecology.
4. Produce a clear and concise critique of the impact of an oil palm or forestry plantation on a riparian system.
5. Demonstrate an understanding of mangroves and their importance in mitigating erosion and pollution.

**Module delivery**
100 hours comprising 20 hours lectures, tutorials, 15 hours practicals, and 65 hours self-study.

**Assessment**
Coursework 70%; Exam 30%

**Essential Reading**
Technical co-operation in agriculture, forestry and fisheries: towards sustainable development of natural resources
F(D)323 Sustainable Use of Non Timber Forest Products (NTFPs)

Module coordinator: Mr Leo Dawson

Module description
An understanding of multi-faceted forest products is vital to the wider understanding of forest resources and their potential markets. This module introduces students to this fundamental concept in sustainable development, and the sustainable use of the forest resource as a primary factor in building resilience in forest-dependent communities. The module includes: The importance of NTFP’s to the economy of smallholder producers. Regional NTFP’s, their production, use, and marketing (Sandalwood, eaglewood, betel, areca palm, fungi). The question of plant variety rights. Ethnobotany, traditional knowledge, and pharmacological markets. Determination of sustainable yield in minor crops. Harvesting, production and marketing. Trademarking of NTFP’s; lessons from the case studies.

Learning Outcomes
By the end of the module students will be able to:
1. Produce critical appraisal of varying production and market methods of NTFPs at a regional level.
2. Illustrate an understanding of the use of NTFPs and their place in global markets.
3. Identify the limitations to NTFP production and marketing, and propose resolutions.
4. Identify the importance of traditional knowledge and how it can be applied in a global context.
5. Determine the sustainable yield of a NTFP using production forecasting methodology.

Module delivery
100 hours comprising 20 hours lectures, 10 hours tutorials and 70 hours self-study.

Assessment
Coursework 80%; Exam 20%

Essential Reading
Shackleton, S., Shakleton, C. Shanley, P., Non-Timber Forest Products in the Global Context


Marshall, E. et al., Commercialisation of Non-Timber Forest Products; Factors Influencing Success; Lessons Learned from Mexico and Bolivia and Policy Implications for Decision-Makers, UNEP.


F(D)324 Sustainable Palm Oil

Module Coordinator: Mr Leo Dawson

Module Description
Deforestation due to commercial palm oil is the single biggest threat to the natural forests of PNG. Similarly, weak land tenure and complex economic and social arrangements present a major obstacle to sustainable development in the tropics. In this context, this module gives students a sound induction into the opportunities for sustainable production of this resource, alternatives to the current means of production, marketing, and certification.

The module covers global significance of the oil palm industry and uses of the product. Where is it grown, where and how is it and utilized. Where the profits go and the ecological and social costs incurred. The ecology of oil palms, their commercial hybrids, and their significant differences. Conventional methods of production, nurseries, nutrient, water and chemical demands. Problems with low genetic diversity monoculture and the evolution of pest and diseases. Social and environmental impacts of conventional production. By-products and their use. The RSPO and certification; working towards sustainability. Best management practices. The future of oil palm in the context of sustainable development.
Learning Outcomes
By the end of the module students will be able to:
1. Describe the global market for conventional oil palm products from production to consumption.
2. Identify the common environmental impacts of conventional oil palm production.
3. Compare and contrast the complex social and economic impacts of oil palm production.
4. Identify the threats, limitations, and opportunities from certification in the oil palm industry.
5. Present a clear and concise argument for supporting sustainable palm oil production; identifying the major challenges and opportunities for producers from smallholder to commercial plantation.

Module delivery
100 hours comprising 20 hours lectures, 15 hours practicals, and 65 hours self-study

Assessment
Coursework 75%: Exam 25%

Essential Reading
Lai, O. M., Tan, C. P. and Akoh, C. C., (Eds), Palm Oil: Production, Processing, Characterization, and Uses

F(D)325 Environmental Services and Forest Management
Module coordinator: TBA
Module description
This module will give students an understanding of environmental services provided by forests in the context of multifunctional forest management. The module defines environmental services, and why they are important including: Climate regulation, biodiversity conservation, carbon capture and sequestration, Hydrology and flood regulation, land stability and soil conservation, undiscovered species and their potential importance in pharmaceuticals and other products. Forest management and maintenance of the integrity of the forest estate (e.g. species composition, biological diversity, watercourses and drainage, soil and hydrology). REDD, REDD+, and other policy instruments for environmental services. Valuing environmental services; natural capital, Payments for Environmental Services (PES). PNG national policy approach to environmental services and PES.

Learning Outcomes.
By the end of the module students will be able to:
1. Define environmental services, and why they are important in forest management accounting.
2. Explain the importance of PNG forests from an ecosystems services approach.
3. Compare and contrast international frameworks and conventions for valuing ecosystems services.
4. Critically review PNG national policy incorporation of ecosystem services.
5. Identify the challenges and risks of PES to forest conservation and management considerations, and the subsequent effect on livelihoods.

Module delivery
100 hours comprising 20 hours lectures, 10 hours tutorials, and self-study.

Assessment
Coursework 60%: Exam 40%

Essential Reading
Chapin, S. F., Kofinas, G. P. and Folke, C. (Eds), Principles of Ecosystem Stewardship
Resilience-Based Natural Resource Management in a Changing World
Tacconi, L. et.al. (2010) Payments for Environmental Services, Forest Conservation and Climate Change, Edward Elgar Publishing
Vegetation-Climate Interaction: How Vegetation Makes the Global Environment, Jonathan Adams Springer Link (Online service) Springer eBooks
Montagnini, F. and Jordan, C. F., Tropical Forest Ecology; The Basis for Conservation and Management

**F(D)326 People and Forests**

*Module coordinator: TBA*

*Module description*

This module develops an understanding of the role forests play in the livelihoods of people regionally and globally in terms of development. It introduces the social and economic principles centred on forest management, and teaches students to apply sustainable developmental principles in their approach to forest management. The module includes: The concept of the social license to operate. Cultural awareness and differences. Food security and livelihood considerations. The sustainable livelihood framework/approaches to determining sustainability. The role of the different forms of capital and their influence on forest management. The role of fuelwood. Customary land and rights/land tenure. Labour and employment. Profit sharing arrangements. Participatory management Peri-urban forestry.

**Learning Outcomes.**

By the end of the module students will be able to:

1. Critically analyse the impacts of the forest industry on and local communities.
2. Explain the global social issues associated with sustainable forest management.
3. Compare and contrast the different approaches used in forest management in terms of their influence on livelihoods.
4. Identify the barriers to sustainable development in forestry, and apply a systems thinking approach to overcoming regional challenges.

**Module delivery**

100 hours comprising 20 hours lectures, 10 hours tutorials and 70 hours self-study.

**Assessment**

Coursework 80% (report and presentation): Exam 20%

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**Essential Reading**

Messerschmidt, D. A., Rapid appraisal for community forestry: the RA process and rapid diagnostic tools.

Shah, T. Gain from social forestry: Lesson from west Bengal

Makim, A., Globalisation, community development and Melanesia: the North New Georgia sustainable social forestry and rural development project

An introduction to gender concepts and definitions for Pacific Island planners on integrating gender concerns in agriculture, fisheries and forestry. United Nations Development Fund for Women (UNIFEM)

Enhancing livelihoods in Lao PDR through environmental services and planted-timber products


**F(D)327 Natural Forest Silviculture**

*Module coordinator: TBA*

*Module description*

This module teaches the reasoning and techniques behind NFS. It covers the history of silviculture in PNG and tropical forestry in general. The current approach to silviculture systems in PNG. The process of harvest, regeneration techniques, management of the growing stocks, enrichment planting. Pest and disease issues in natural and semi-natural forests. The application of continuous cover forestry systems, and their differences to conventional systems. Impacts on wildlife, soil water and economics. Infrastructure implications in NFS; transport, machinery, labour. Matching NFS to policy objectives.

**Learning Outcomes.**

By the end of the module students will be able to:

1. Describe the principle differences between natural, semi-natural forests and plantations.
2. Compare the management objectives in natural and semi-natural forests.
3. Recognize the importance of NFM as a sustainable management option.
4. Identify the challenges to NFM and present options for amelioration.
5. Outline the fundamentals of differing CCF systems and their application in NFM.

Module delivery
100 hours comprising 20 hours lectures, 15 hours practicals and 65 hours self-study.

Assessment
Coursework 50%; Exam 50%

Essential Reading
Weber, G. S., Stimm, M. and Reinhardt, B. M., Silviculture in the Tropics
Richards, F. W. The tropical rainforest: an ecological study
Nakashizuka, T. (Ed), Sustainability and Diversity of Forest Ecosystems; An Interdisciplinary Approach

F411 Agroforestry
Module coordinator: TBA

Module description
This module introduces the potential role of integrating trees into farming systems. Agroforestry is commonplace in tropical agriculture but remains very rare in temperate farming systems. This module explains why agroforestry is such an important part of tropical agriculture. The module covers the practical agronomy of growing tree crops and integrating trees in with other farming systems. To be able to do this, it first explores the science behind intercropping.

Learning Outcomes.
By the end of the module students will be able to:
1. Demonstrate a clear understanding of the theories of resilience, complementarity, facilitation and the diversity yield relationship.
2. Explain the advantages and disadvantages of a range of traditional agroforestry systems.
3. Apply de Witt replacement design to optimise the agronomy of a two species mix.

F413 Forest Policy
Module coordinator: TBA

Module description
This module provides students with an understanding of the national and international policy frameworks in place for the forest industry, and the key drivers behind policy development which facilitate trade and economic growth. It also covers the implications of current policy frameworks on livelihoods and environmental management.

Learning Outcomes.
By the end of the module students will be able to:
1. Explain how the current forestry policy framework in PNG developed.
2. Critically review global forest policies and how they affect national strategies.
3. Define the key factors in policy determination, and recognise where there are challenges in policy development.
4. Compare and contrast the principle legal instruments which determine policy.
5. Review the implications of policy instruments to livelihoods and sustainability.

Module delivery
100 hours comprising 20 hours lectures, 10 hours tutorials and 70 hours self-study.

Assessment
Coursework 60%; Exam 40%
### Essential Reading
- Revised National Forest Policy PNG
- McDermott, C. L., O’Carroll, A. & Wood, P., International Forest Policy – the instruments, agreements and processes that shape it, Department of Economic and Social Affairs United Nations Forum on Forests Secretariat

### F414 Forest Economics

**Module Coordinator: TBA**

**Module Description**

This module provides students with an introduction to basic economic theory and application in the forest sector. It includes: The definition of economics and the differences to financial analysis. Micro and macroeconomic policy and their effect on development. Discounting, calculating NPV of forest resources, and estimation of benefits. Multiple-use economics and the optimisation of NPV. Risk and uncertainty. Cost/benefit analysis and the private/societal disparity in forest valuation. Undervaluation of forests. Environmental services. PNG forest economic policy

**Learning Outcomes.**

By the end of the module students will be able to:
1. Demonstrate a clear understanding of how the principles of economic theory are applied in decision making with the forestry industry.
2. Produce a critique of aspects of forest economic policy within PNG.
3. Describe the processes of discounting, net present value calculation in the context of forestry operations.
4. Determine NPV from a given forestry-specific scenario.
5. Undertake a cost/benefit analysis in a given scenario.

**Module Delivery**

100 hours comprising 20 hours lectures, 15 hours tutorials and 65 hours self-study.

### Assessment

Coursework 50%: Exam 50%

### Essential Reading


### F422 Certification and legality in Forestry

**Module Coordinator: TBA**

**Module Description**

This module introduces the need for traceability in market chains for forest products, the legal framework underpinning the national and international timber trade, and certification systems; their influence, their effects on producers, and how they operate in a global marketplace. The module covers: The drivers of a need for proof of legality (mandatory) and certification (voluntary), within the industry, locally and in the international market place. The chain of custody and its role in forest management. The legality frameworks, the certification systems, the role of certification and marketing. The linkage between certification and legality, and their differences. The balance of community rights and the requirements of certification and legality. The limitations of certification systems, and their effect on producers and sustainable development. DNA barcoding and high-tech tracking methodologies. Future planning for certification for forest managers.

**Learning Outcomes.**

By the end of the module students will be able to:
1. Demonstrate a broad comprehension of different certification systems.
2. Critically analyse certification systems and their limitations.
3. Identify relevant national and global policy mechanisms which affect opportunities in timber export markets.
Module description

This module provides students with an understanding of climate change and the important role that forests have to play in amelioration of anthropogenic impacts. It includes an explanation of how carbon markets associated with climate change work. The module covers: the greenhouse effect and the enhanced greenhouse effect, This history of the world’s atmosphere, climate, vegetation and rocks. Natural and anthropogenic drivers of climate change. International agreements; The UNFCCC, the Kyoto Protocol, The Paris Agreement, National commitments; PNG Nationally Determined Contributions (NDCs)
National greenhouse policy, greenhouse conventions, Carbon systems, carbon mitigation, carbon accounting, national carbon accounts the impact of climate change in forestry; fires, droughts, flooding, mangroves, growth and biological diversity Planning for climate change in the forestry sector; building diversity.

Learning Outcomes.
By the end of the module students will be able to:
1. Explain the difference between the greenhouse effect and the enhanced greenhouse effect.
2. Describe the drivers of climate change.
3. Critically review the development of international accords and climate change policy.
4. Reference national policy in the global context.
5. Explain the impacts of climate change in the forestry sector, and the importance of planning for a changing climate.

Module delivery
100 hours comprising 20 hours lectures, 10 hours tutorials and 70 hours self-study.

Assessment
Coursework 50% (essays): Exam 50%

Essential Reading
Yamin, F. (Ed) (2005), Climate Change and Carbon Markets, Taylor and Francis, ProQuest E-book Central,
Freer-Smith, P. H., Broadmeadow, M. S. J. and Lynch, J. M. (Eds) (2007), Forestry and Climate Change, CABI, ProQuest E-book Central,
Lieberman, D., Jonas, M., Nahorski, Z., Nilsson, S. (Eds), Accounting for Climate Change; Uncertainty in Greenhouse Gas Inventories — Verification, Compliance, and Trading

Sustainable Fisheries and the Marine Resource

M111 Introduction to Fisheries
Module coordinator: Mr Aisi Anas
Module description
It is essential that all UNRE students understand the role of natural living resources including agricultural, forestry, tourism and fisheries, in sustaining human livelihoods and economies. Students must then recognise the
need to develop and utilise these resources and their environments in a sustainable manner. This module is vital in developing the understanding of sustainable utilization of fisheries and marine resources and their environment, globally and in PNG. It covers the basics of fisheries sciences in two parts: the human dimension of fisheries includes diversity of fishing gears and their designs, the history of capture and culture fisheries and the marketing of fishery products, gathering data for resource monitoring and fisheries management, models for fisheries resource assessment, and marine protected areas. Fisheries biology includes the identification, description, measuring, analysis and prediction of biological processes which are used to provide knowledge for optimal management of exploited fisheries. It also introduces to the taxonomy, anatomy and identification of fishes and invertebrates and it reviews the fisheries and fisheries resources of PNG and the world. Finally, it introduces to the principles of fish population dynamics.

Learning Outcomes
By the end of the module students will be able to:
1. Explain the differences in characteristics, types and levels of fishing operations.
2. List the main types of fishing gears and discuss their historic developments.
3. Discuss the complexity of fisheries and the potential impact on the environment and overfishing.
4. Discuss the importance of fisheries science (e.g. fisheries biology) in relation to promoting sustainable fisheries.
5. Demonstrate the basic understanding of the methods used to collect fisheries data.

Module delivery
100 hours per semester comprising 20 hours lectures, 15 hours seminars and practicals and 65 hours self-study.

Assessment
Coursework 50%; Exam 50%

Essential Reading

M211 Biology of Fisheries Resources
Module coordinator; Mr Joe Aitsi
Module Description
This module teaches the biology and ecology of fish and aquatic macro invertebrates. It includes the diversity of species that support or have the potential to support both capture and aquaculture fisheries. Students will recognise that managing the use of fisheries and marine resources is complex and may result in either sustainable or unsustainable fisheries. They will understand that fisheries are sustained by species populations from the wild, hence a good and detailed understanding of the biology and ecology of organisms is necessary to make informed management decisions based on scientific facts. The module focuses on the general biology and ecology of finfish and aquatic macro-invertebrates including general classification, trends in evolution, diversity, swimming and locomotion, colouration, integrative and sensory biology, physiology, circulatory and respiratory systems, osmoregulation, feeding ecology and digestion, migration, reproduction, age and growths. Early life history topics cover the importance of understanding egg and larval development and mortality.

Learning Outcomes
By the end of the module students will be able to:
1. Use scientific classification systems to identify and group fish based on external and internal characteristics.
2. Apply knowledge of fish biology in describing their physiology and ecology
3. Describe the biological processes of recruitment and migration, and state how these influence the ecology of fishes.
4. Discuss phylum mollusc (gastropods, bivalves, cephalopods, echinoderms) organism characteristics, general body plan, reproductive biology and feeding habits.
5. Describe crustacean constraints, general morphology, respiration and circulation, nervous system, reproduction and development as compared to other arthropods.

Module delivery
100 hours per semester comprising 20 hours lectures, 15 hours seminars and practicals and 65 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading

M212 Introduction to Aquatic Ecosystems
Module coordinator: Mr Vonklauss Siwat
Module description
This module familiarises students with different aquatic ecosystems, teaching them the diversity of aquatic ecosystems, and also their uniqueness in structure and function at all levels (biological, physical, chemical). Students will appreciate that all systems are linked so that positive or negative impacts on one system affects the others. This is vital in understanding how natural ecosystems function sustainably, and that fisheries should be managed by emulating sustainable natural systems. The module introduces students to the most common methods and skills in field sampling of marine biology and ecology, freshwater biology and ecology, and aquatic ecology in general.
Learning Outcomes
By the end of the module students will be able to:
1. Identify the key aquatic ecosystems found in PNG, the tropics and globally and discuss the basic understanding of their ecologies
2. Identify key flora and fauna found in East New Britain’s streams, estuaries, coral reefs and sea grass meadows
3. Demonstrate an understanding of the important ecological relationships in the earth’s diverse aquatic ecosystems
4. Outline and differentiate between physical and chemical characteristics of water and different aquatic ecosystems
5. Demonstrate an understanding of the potential consequences of natural and human disturbance events on the structure and function of aquatic ecosystems in PNG and the tropics.

Module delivery
100 hours per semester comprising 20 hours lectures, 19 hours seminars and practicals and 61 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading
Castro P. & Huber, M. E. (2010), Marine Biology (8th edn.), Blackwell Publishing

M221 Marine Conservation Biology
Module coordinator: Mr Walain Ulaawi
Module description
This module covers conservation principles for coastal and marine resources as well as community based fisheries management and political ecology of fishing communities in Papua New Guinea and the Pacific region. It focusses on coastal and marine conservation strategies for marine ecosystems; special feature of rare and endangered marine organisms found in Papua New Guinea and in the pacific; marine conservation planning tools used at different scales; and an integration of community conservation
management with a special focus on local marine management in Papua New Guinea.

Learning Outcomes
By the end of the module students will be able to:
1. Describe fundamental biodiversity and conservation principles.
2. Design community appropriate engagement plans including zoning and monitoring plans.
3. List the different types of participatory rural appraisal tools and demonstrate use of each PRA tool in local communities.
4. Evaluate community resource utilisation and identify high value conservation areas.

Module delivery
100 hours comprising 20 hours lectures, 16 hours tutorials, practicals and field visits and 64 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading
Groves, C. & Game, E. T. (2016), Conservation Planning - Informed decisions for a healthier planet,

M222 Fishing Operations and Gear Technology
Module coordinator: Mr Vonklauss Siwat

Module description
This module will teach students the development of the major fishing gears and their fishing methods so that they can link fishing activities to species ecology and fisheries management. Students will be given hands-on experience of the design, construction, operation and maintenance of common fishing gears. Field operations of these self-constructed gears allow students the benefit of understanding linkages between fishing method, target species, and catch rates. Students will appreciate the importance of seamanship and maritime skills to effectively carry out tasks on-board a fishing vessel or a small sea-craft. Survival at sea and firefighting on-board a vessel will be covered. Students will be taught to start and operate an outboard motor engine up to 40 horse power. The module also introduces students to the practice and opportunities for fisheries entrepreneurship.

Learning Outcomes
By the end of the module students will be able to:
1. Identify the main types of fishing gears and describe their line of development
2. Demonstrate a working knowledge on the design, construction, operation, and maintenance of gill nets, troll lines, bottom longlines, and handlines
3. Discuss the main target species for the different types of fishing gears and methods
4. Demonstrate competency in the skills for sea safety, fire safety and survival techniques
5. Demonstrate seamanship skills and techniques related to rope work knots and splicing, electronics devices and their operations and interpretations for navigation and fishing operations.

Module delivery
100 hours comprising 20 hours lectures, 27 hours tutorials, practicals, field visits and 63 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading
National Fisheries College (2010), Basic Sea Survival – Personal Survival Techniques: Student Learning Guide, National Fisheries College (NFC), Kavieng, PNG
National Fisheries College (2010), Small Fishing Operations – Safe boat operations, National Fisheries College (NFC), Kavieng, PNG
Beverly S. et al. (2003), Horizontal Longline Fishing – Methods and Techniques: A Manual for Fishermen, Secretariat of the Pacific Community, Noumea, New Caledonia
M223 Introduction to Tropical Seafood

Module coordinator: Mr Yaosa Kaikar

Module description
This module reviews the major seafood resources exploited in the tropics. Physiological and nutritional aspects of seafood, post-harvest seafood handling methods, spoilage and control measures, seafood hazards and control measures, seafood preservation methods ((both traditional and modern), and quality control systems. The module also introduces students to HACCP, GMP and SSOP. A critical analysis is made of the role of PNG in traditional and modern processing industries and seafood quality issues in the regional and global context are examined in some detail.

Learning Outcomes
By the end of the module students will be able to:

1. State the major sea-foods that are exploited in the tropics
2. Identify the seafood spoilage factors and their control measures
3. Describe the various traditional and modern preservation methods used in PNG and globally
4. Outline the general principles associated with seafood quality assurance system
5. Explain the principles of the HACCP System and identify major food safety hazards associated with major sea-foods exploited commercially

Module delivery
100 hours comprising 20 hours lectures, 18 hours tutorials, practicals, and 62 hours self-study.

Assessment
Coursework 50%; Exam 50%

Essential Reading
FAO (1998), Food Quality & Safety Systems; a training manual on Hygiene and HACCP by FAO, Rome, Italy.


M224 Introduction to Fisheries and Marine Resources Management

Module coordinator: Mr Walain Ulaiwi

Module description
Students will be taught the biological and ecological nature of fisheries resources, and the critical role played by social and economic needs, wants and aspirations of society that influence human behaviour towards utilisation of fisheries resources. Students will be introduced to how this knowledge is applied in managing fisheries and aquatic resources. This will include a brief overview of the tools available for resource management, and the institutional, legal and administrative structure and mechanisms that must be in place to facilitate effective management.

Students will guided to appreciate the limitations in the applications of biological/ecological and socio-economic information to achieve sustainable resource use due to the peculiar socio-economic context in fisheries systems that affect sustainable exploitation and management.

Learning Outcomes
By the end of the module students will be able to:

1. Describe how fish and other living marine organisms can be managed as renewable resources,
2. Outline the role of Fish Stock, MSY and population reference parameters as key concepts in understanding sustainable fisheries and marine resource management
3. Describe how social and economic factors that underpins human behaviour can contribute towards sustainable or unsustainable resource exploitation practices
4. Identify the various Fisheries Management tools that are available and
Module delivery
100 hours comprising 20 hours lectures, 25 hours tutorials, practicals, field visits and 55 hours self-study.

Assessment
Coursework: Exam 50%

Essential Reading
Payne, A. et al. (2008), Advances in Fisheries Science. Blackwell Publishing
Jennings, et.al. (2001), Marine Fisheries Ecology, Blackwell Publishing

M229 Applied Ecology
Module coordinator: Mr Lloyd Werry

Module description
Developing an understanding of applied ecology is essential for all UNRE graduates if they are to develop more sustainable methods of natural resource management. The module examines the ecological underpinning of conservation biology and restoration ecology. It focuses on the aspects of the ecology of direct importance to conservation biology and the connection between ecological theory and conservation biology. It covers measures of biodiversity, extinction dynamics, invasive species, species and natural product harvesting (population viability analysis), genetic and spatial connectivity of populations, ecosystem resilience and resistance, community assembly in the context of restoration.

Learning Outcomes
By the end of the module students will be able to:
1. Describe the ecological process that regulate populations and species ranges
2. Explain the impact of harvesting on the populations of wild species
3. Compare and contrast various methods used by humans to control populations of wild species
4. Compare and contrast various methods used by humans to enhance populations of wild species.
5. Describe the main environmental impacts of humans in PNG

Module delivery
100 hours comprising 20 hours lectures, 22 hours tutorials, practicals, field visits and 58 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading

M(D)311 Fisheries Marketing Management
Module coordinator: Dorothy Worogop

Module description
This module will equip graduates in fisheries with the necessary tools, knowledge and skills to be effective and efficient in becoming marketers of fisheries products both in the domestic markets and the global markets. The module covers the importance of Fisheries Marketing within the region and in the international arena and discusses various marketing theories and concepts practised in the micro and macro economy. It includes the following: Fisheries Marketing, Basic Economic Concepts, Fisheries Business Market Planning, SWOT Analysis – Assessing and choosing business ideas, Market Segmentation, Export Marketing, Value Adding, Marketing Management, Consumer Behaviour, Supply and Price Determination, Competitive Marketing, Market Regulations, Production and Marketing Schedules, Sectors of Fisheries Business, New Product and Service Development, Product Life cycle, Intermediary organisations and the Sales Process.
Learning Outcomes.
By the end of the module students will be able to:
1. Identify the factors affecting the regional fisheries markets
2. Apply marketing theory to develop an appropriate strategy in an increasingly dynamic market.
3. Review the marketing of fisheries products in the local, national and the global markets.
4. Develop a marketing solution to address a specific issue.

Module delivery
100 hours comprising 20 hours lectures, 14 hours tutorials, field visits and 66 hours self-study.

Assessment
Degree Coursework 60%: Exam 40%
Diploma Coursework 50%: Exam 50%

Essential Reading
Kotler et.al. (2007), Marketing (7th edn.), Pearson Education, Australia.

M(D)312 Fisheries observing, monitoring and statistics
Module coordinator: Mr Aisi Anas
Module description
It is essential that Fisheries graduates understand the importance of fisheries statistics in making informed management decisions. To realise this understanding, students will carry out applied fisheries statistics activities and experience what is involved in how, where and when to obtain fisheries data and then derive scientific information for fisheries management. Students will appreciate why and how statistics is vital for applied fisheries and research. This module includes: Fisheries observing and monitoring systems in PNG and globally. Classification of fisheries data and ways in which they are obtained. Processing and analysis of fisheries data. Presentation of fisheries data. Basic single variable statistics. Correlation and regression. Linear transformations. Inputting of fisheries statistics in fisheries management.

Learning Outcomes
By the end of the module students will be able to:
1. Discuss the need to monitor and observe fisheries activities and collect appropriate fisheries data for fisheries management.
2. Describe the standard classes of fisheries data types and the appropriate methods to collect them.
3. Collect, process and analyses fisheries data to answer specific scientific and management questions.
4. Interpret fish population data and make recommendations for stock management.

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials, practicals, field visits and 60 hours self-study.

Assessment
Coursework 40%: Exam 60%

Essential Reading

M(D)313 Freshwater Ecology and Limnology
Module coordinator: Mr Lloyd Werry
Module description
Freshwater biomes are a vital component of the biosphere. They constitute lakes, marshes, streams, and rivers. The aim of this module is to develop understanding of the physical, chemical, and biological properties of freshwater ecosystems and to become familiar with techniques used in research of freshwater ecosystems. The module...
introduces concepts, theory, and methods which can be integrated to address basic and applied problems in fresh waters. Emphasis will be given to building field research skills and the quantitative aspects of managing, analysing, writing, and graphing field data. 

**Learning Outcomes.**

By the end of the module students will be able to:

1. Compare and contrast the physical, chemical and biological characteristics of different freshwater ecosystems.
2. Describe ecological processes; energy dynamics and nutrient cycling.
3. Classify organisms according to their ecological importance such as functional feeding groups, their basic taxonomy to relate them to freshwater food web.
4. Explain the role of different groups of organisms in ecosystem functioning in freshwater systems.
5. Explain theoretical concepts and methods used in freshwater ecology and limnology.

**Module delivery**

100 hours comprising 20 hours lectures, 25 hours tutorials, practicals, field visits and 55 hours self-study.

**Assessment**

Coursework 40%; Exam 60%

**Essential Reading**

Closse, G. et. al. (2004), Freshwater ecology – a scientific introduction, Blackwell Publishing


**M(D)314 Small Business Planning**

*Module coordinator: Ms Dorothy Worogop*

**Module description**

The module provides the theoretical framework to understand why within our region some small businesses fail and other succeed. The module will develop analytical skills enabling students to appraise small tourism operations and to develop a better understanding of particular problems faced by this sector of the economy.

**Learning Outcomes.**

By the end of the module students will be able to:

1. Review the factors affecting growth, development and viability of small businesses within the region.
2. Write a business plan for establishing and developing a local enterprise.
3. Appreciate the dynamic and complex nature of the small business sector and its contribution to the economy.
4. Describe the history of National and Regional Government support for the small business sector.

**Module delivery**

100 hours comprising 20 hours lectures, 25 hours tutorials, practicals, field visits and 60 hours self-study.

**Assessment**

Degree Coursework 40%; Exam 60%

Diploma Coursework 60%; Exam 40%

**Essential Reading**


Pomeroy, R.S & Andrew, N.L. (2011), Small Scale Fisheries Management: Frameworks and Approaches for the Developing World, CABI publishing,

**M(D)321 Aquaculture**

*Module coordinator: Mr Malagat Boas*

**Module description**

Half of the world fish protein supply now comes from aquaculture. This module will teach students the importance of aquaculture as an industry in contributing towards world food production. Students will learn that aquaculture enhances capture fisheries by restocking overfished fish populations by growing fish in controlled systems and releasing these in natural ecosystems. The module will also teach the role of aquaculture in environmental destruction and pollution, and how these can be controlled and
managed to ensure aquaculture is a sustainable natural living resource industry.

Learning Outcomes.

By the end of the module students will be able to:

1. Discuss global developmental trends in aquaculture and why aquaculture is important to PNG;
2. Describe techniques used in pond construction, the management of water and cultured organism, feed formulations and management in different aquaculture systems;
3. Describe the different water quality parameters, their effects on the health of a cultured species, and the methods used in measuring these parameters.
4. Describe the different elements involved in combined rearing of aquatic and terrestrial species to promote sustainable vegetable crop production.
5. Explain the environmental impacts of aquaculture.

Module delivery

100 hours comprising 20 hours lectures, 27 hours tutorials, practicals and 53 hours self-study.

Assessment

Coursework 50%: Exam 50%

Essential Reading


M(D)322 Tropical Seafood Science

Module coordinator: Mr Yaosa Kaikar

Module description

This module provides information on major seafood exploited in the tropics. It discusses physiology of seafood resources, nutritional quality, spoilage and control measures, hazards and control measure, processing (both traditional and modern innovative), preservation, quality and safety assurance systems are examined. This includes a critical analysis of the role of traditional and modern processing industries in PNG. Regional and global seafood quality and safety issues are examined in some detail.

Learning Outcomes.

By the end of the module students will be able to:

1. Describe the post mortem changes that occur in fish.
2. List key procedures for seafood handling, processing and preservation (traditional and modern).
3. Explain the elements of Food Quality Assurance System.
4. Design HACCP Systems for seafood industries.

Module delivery

100 hours comprising 20 hours lectures, 18 hours tutorials, practicals, and 62 hours self-study.

Assessment

Coursework 50%: Exam 50%

Essential Reading


M(D)323 Inland Fisheries

Module coordinator: Mr Walain Ulaiwi

Module description

Inland fisheries are an important component of capture fisheries. This module gives an overview of the global importance of inland fisheries and places special emphasis on the status of inland fisheries in PNG and the potential they hold for fish production, food security and poverty alleviation in rural areas. It covers all aspects of inland fisheries, including topics such as fishing methods, biology and ecology of important food fish species and their fishery, the inland water systems (rivers, lakes, floodplains etc.) and the topographical and hydrographical regimes that influence and sustain these fisheries. Competing land-use/development practices, pollution and habitat modifications which affect inland fisheries are also presented and discussed.
Learning Outcomes.
By the end of the module students will be able to:
1. Identify and describe the different types of inland water systems and the fishery they support.
2. Describe the important ecological and biological process that underpins the productivity of inland waters.
3. Describe the types of fishery in inland waters, types of fishers, fishing methods and the management measures and strategies that are used in managing these fisheries.
4. Evaluate and discuss the vulnerability of inland waters and their fishery to anthropogenic impacts.
5. Identify and discuss the problems and issues that arise due to competing uses of inland waters by different stakeholders.
6. Critically analyse the management measures that could be applied to address the competing demands faced by inland waters.

Module delivery
100 hours comprising 20 hours lectures, 19 hours tutorials, practicals and 61 hours self-study.

Assessment
Degree Coursework 60%: Exam 40%
Diploma Coursework 50%: Exam 50%

Essential Reading

M(D)324 Fisheries Oceanography
Module coordinator: Mr Vonklaus Siwat

Module description
Oceanography is the study of oceans, and includes aspects of its biology, chemistry, physics, ecology, and climatology. The biological component (fish and other marine organisms from macro to micro flora and fauna) makes up the main content of this module. Flora and Fauna in the marine environment interact amongst themselves and with the non-living component (chemical, physical, and climatological). In order to understand the lives of and the behaviours of the living organisms existing in the marine environment these living and non-living factors also play influential roles.

Learning Outcomes.
By the end of the module students will be able to:
1. Discuss the importance of oceanic circulations or currents in both local and global scales on marine life.
2. Describe marine chemistry and its influence on ocean dynamics.
3. Identify and describe organisms of the ocean in their major groups of plankton and nekton.
4. Explain energy flow in food webs and nutrient cycles in the marine environment.
5. Discuss impacts of the climate on fisheries.

Module delivery
100 hours comprising 20 hours lectures, 18 hours tutorials, practicals, and 62 hours self-study.

Assessment
Degree Coursework 60%: Exam 40%
Diploma Coursework 50%: Exam 50%

Essential Reading
Steele, J.H. et al. (eds.) (2009), Climate and Oceans, Blackwell Publishing.
**M(D)325 Introduction to climate change impacts to fisheries and aquaculture**  
*Module coordinator: Mr Joe Aitsi*

**Module description**  
This module includes the physical and ecological implications on Fisheries and Aquaculture systems with a focus on the large-scale changes related to changing temperature, winds and acidification and how these factors affect the distribution, abundance, species composition and the overall productivity of an area. The module will emphasize the observed and expected changes both globally and regionally, outlining the implications to fishery dependent island economies and communities as it looks at management measures and policies in place.

**Learning Outcomes.**

By the end of the module students will be able to:

1. Identify the main potential impacts of climate change on Fisheries
2. Describe largescale factors that influence the distribution, abundance, species composition and overall productivity;
3. Compare and contrast various climatic change projections both regionally and globally;
4. Discuss the implications of climate change on fishery-dependent island economies and communities;
5. Critically evaluate the climate change adaptive management strategy and policies in Papua New Guinea and around the Western Pacific region

**Module delivery**

100 hours comprising 20 hours lectures, 20 hours tutorials, practicals, field visits and 60 hours self-study.

**Assessment**

Degree Coursework 60%: Exam 40%
Diploma Coursework 50%: Exam 50%

**Essential Reading**

Bell, J., et al. (2016), Vulnerability of Tropical Pacific Fisheries and Aquaculture to Climate Change, SPC, Noumea, New Caledonia

**M411 Biology, Ecology and Management of Commercial Fisheries Species in PNG**  
*Module coordinator: Mr Joe Aitsi*

**Module description**

This module provides the knowledge and skills to develop management strategies specific to existing commercial fisheries in PNG. Students will explore the successes and failures of management strategies applied in current fisheries in PNG, then identify corrective or improvement measures to make them sustainable. They will obtain vital biological and ecological data about each specific resource species. By studying a chosen species, students will appreciate the practical steps involved in acquiring information, deriving policy and making informed decision for sustainable fisheries.

**Learning Outcomes.**

By the end of the module students will be able to:

1. Describe the biology and ecology of finfish species important to the commercial fisheries in PNG.
2. Design an ecological investigation to determine the impacts of a named local fishery.
3. Develop an ecological model to predict Maximum Sustainable Yield of a named marine species.
4. Propose a stock management system to sustainably harvest a named species.

**Module delivery**

100 hours comprising 20 hours lectures, 17 hours tutorials, practicals and 63 hours self-study.

**Assessment**

Coursework 50%: Exam 50%

**Essential Reading**


M412 Fisheries climatology
Module coordinator: Mr Aisi Anas
Module description
This module explores the possible impacts of climate and climate change on the productivity, abundance, distribution, and dynamics of marine fish stocks. Specific content includes: Premise to understand effects of climate and climate change on fish and fisheries. Regime shifts in marine ecosystems. Detecting regime shifts, climate indices, El Nino and La Nina. Major global oceanic currents, upwelling and their contribution to fisheries. Migration strategies of marine species - Triangular Migration Hypothesis, horizontal migrations, vertical migrations. Case studies of climate impacts on fish stocks - Peruvian anchovy Engraulis ringens, sardines and upwelling and El Nino, Skipjack tuna and El Nino in the Pacific, barramundi and El Nino in PNG, Cod stocks of Northern Hemisphere and climate change. Climate change effects on fisheries and fisheries management.

Learning Outcomes.
By the end of the module students will be able to:
1. Justify the need to integrate the impacts of climate into models of fish stock assessment.
2. Explain how climate affects fish at the individual, population and ecosystem levels.
3. Propose and describe the direct and indirect pathways in which climate affects a fish stock.
4. Evaluate impacts of climate on specific fish species in PNG, the Pacific and around the globe.
5. Appraise and explain the concept of "fishing down the food-web".

Module delivery
100 hours comprising 20 hours lectures, 18 hours tutorials, practicals, and 62 hours self-study.
Assessment
Coursework 50% Exam 50%

Essential Reading
Brander, K. M. (2007), Global fish production and climate change, The National Academy of Sciences

M413 Marine pollution assessment
Module coordinator: Lloyd Werry
Module description
This module provides an overview of the diverse issues related to coastal and marine pollution from human activities and how these can holistically affect marine ecosystems, fisheries habitats and resources. It presents marine litter highlighting synthetic by-products, plastics, and lost or abandoned fishing gear; oil pollution from spills and ships; pollution from chemicals discharged; and how municipal wastewater can also contribute to marine pollution. International agreements such as MARPOL as examples of marine pollution monitoring/regulating instruments for states to conform to are highlighted. The module also covers risk assessments and the practical use of biological and chemical markers in pollution assessment.

Learning Outcomes.
By the end of the module students will be able to:
1. Compare and contrast the impacts of a range of pollutants on the marine environment.
2. Describe the characteristics of a range of pollutants including their toxicity and persistence.
3. Perform a risk assessment and biological assessment for a range of potential pollution scenarios.
4. Critically evaluate the effectiveness of different international conventions on harmful substances abuse.

**Module delivery**
100 hours comprising 20 hours lectures, 17 hours tutorials, practicals, field visits and 63 hours self-study.

**Assessment**
Coursework 50%; Exam 50%

**Essential Reading**

**M421 Fish population dynamics**

*Module coordinator: Aisi Anas*

**Module description**
This module provides an introduction to the theoretical models, quantitative methods and estimation of the population parameters required for fishery assessment. It examines advanced concepts and methods in fish population dynamics and stock assessment, with emphasis on the design of harvest policies for sustainable fisheries. Topics covered include: Population and individual fish growth; Mortality; Length-based methods; Recruitment; The dynamic pool approach; the surplus production approach; Virtual population analysis; Simple bio-economic models. Students will learn to apply the main methods used today for fisheries assessment, along with pitfalls and examples of where these methods have failed. Presentations on harvest policy design range from simple estimation of targets and reference points to development of experimental, adaptive management policies.

**Learning Outcomes**
By the end of the module students will be able to:
1. Discuss the complexity and dynamics of a fish population, and identify the main factors in the Russell’s model of fish population dynamics that drive such dynamism.
2. Describe the development of a fish stock in terms of biomass, abundance, cohort recruitment and dynamics using specific models such as the Von Bertalanffy Growth Function (VBGF), Exponential Decay Model, etc.
3. Identify, classify and discuss the common fish stock assessment models and management techniques to guide fisheries stock management.
4. Perform calculations to estimate: growth, age, mortality and recruitment parameters to determine the state of a stock from basic ecological data.

**Module delivery**
100 hours comprising 20 hours lectures, tutorials, 30 hours practicals, and 50 hours self-study.

**Assessment**
Coursework 50%; Exam 50%

**Essential Reading**

**M422 Fisheries economics**

*Module coordinator: Dorothy Worogop*

**Module description**
This module covers economic concepts and models and advanced concepts of bio-economic principles and modelling in fisheries and their importance in policy development and analysis. It combines theoretical and applied fisheries economics with specific reference to Papua New Guinea and the

**Learning Outcomes.**
By the end of the module students will be able to:
1. Determine the financial viability of a Fisheries Enterprise in a development in the country.
2. Construct and apply an economic model for making informed decisions on the status of specific fishery product
3. Construct bio economic model to analyse economic and biological effects of fishing under open access and managed fisheries.
4. Critically review the importance of fisheries sector in Papua New Guinea.
5. Critically evaluate the effectiveness of governmental support of the fisheries sector in PNG.

**Module delivery**
100 hours comprising 21 hours lectures, 11 hours practicals and 69 hours self-study.

**Assessment**
Coursework 50% Exam 50%

**Essential Reading**
Kuk, R. and Tioti, J.(2004), Fisheries Policy and Management in Papua New Guinea, ACIAR, Canberra


**M423 Marine law, policy and resource management**

**Module coordinator: Mr Walain Ulaiwi**

**Module description**
This module develops an understanding of how international developments have impacted on development of relevant marine policies and laws. Conventional resource management concepts and approaches, their success and failures, new approaches (such as the concept of Ecosystem Approach to Fisheries/Marine Resources Management), are described and discussed in detail. Through case studies, students gain a deeper insight into the application of the various management tools and approaches to solve problems of unsustainable exploitation of fisheries and marine resources.

**Learning Outcomes.**
By the end of the module students will be able to:
1. Explain how biological and ecological concepts such as “Fish Stock, MSY and other population parameters, are used in the design of marine protection polices
2. Critically evaluate the effectiveness of international treaties, laws and conventions on which local and regional legal systems are developed relevant to ocean and marine resource governance.
3. Describe the impact of international treaties, laws and conventions and how these have impacted and affected the way we do business in PNG.
4. Use tools management, and be able to know when and where these tools can be applied in managing fisheries and marine resources.

**Module delivery**
100 hours comprising 20 hours lectures, 20 hours tutorials, practicals and 60 hours self-study.
Assessment
Coursework 50%: Exam 50%

Essential Reading
Pauly, D. & Murphy, G.I. (1982), Theory and Management of Tropical Fisheries, ICLARM, Philippines
PNG Fisheries Management Act (2008)

M424 Ecological approaches to fisheries management

Module coordinator: Mr Walain Ulaiwi

Module description
This module discusses the concept of ecosystems-based fisheries management for an ecologically sustainable development of fisheries and marine resources. It considers the sustainable use of both species and ecosystems, the maintenance of essential ecological processes, and the preservation of biological diversity. Marine ecosystems are valuable for reasons other than commercial fishing, including the prevention of coastal erosion, climate regulation, nutrient storage, the maintenance of biodiversity and recreation. This module will reveal how the marine environment is in demand and must be managed holistically due to under pressure from many different sources including commercial fishing, subsistence fishing, recreational, aquaculture, tourism, water sports, shipping, coastal developments and industry.

Learning Outcomes.
By the end of the module students will be able to:
1. Evaluate the Guiding Principles for Ecosystem based Management;
2. Develop criteria for designating high conservation/management areas;
3. Design Conservation / Development Landscape and Seascape Plans;
4. Explain the Conservation Adaptive Management Model;
5. Evaluate an existing fisheries management plan

Module delivery
100 hours comprising 20 hours lectures, 21 hours tutorials, practicals, field visits and 59 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading
Christensen, V. & Maclean, J. (2015), Ecosystem Approaches to Fisheries – A global Perspective, Cambridge Publishing

Sustainable Livestock Production

N211 Introduction to Animal Science 1

Module coordinator: Mr Charles Maika

Module description
The module covers the fundamentals of animal science and production systems, including: the various animal body parts and functions, cells, tissues and organs. The following topics are covered by the module; Animal domestication and contributions to humans and the environment. Livestock production systems (small scale, large scale, intensive and semi-intensive systems). Animal behaviour and welfare. Organs and systems of animals (digestive and renal, reproductive, endocrine and central nervous, circulatory and immune systems). Reproduction. Growth and development. Fundamentals of animal nutrition. Animal health and biosecurity. Pastures and forages.

Learning Outcomes.
By the end of the module students will be able to:
1. Describe the process of domestication in the main livestock species
2. Compare and contrast the digestive systems and nutritional requirements in the main livestock species
3. Compare and contrast the diseases and parasites that infect the main livestock species
4. Compare and contrast the main welfare issues in keeping the main species of livestock
5. Compare and contrast the production systems used to raise the main livestock species

**Module delivery**
100 hours comprising 20 hours lectures, 20 hours tutorials and practicals and 60 hours self-study.

**Assessment**
Coursework 40% Exam 60%

**Essential Reading**
Damron, W., Introduction to Animal Science: Global, Biological, Social, and Industry perspective (5th Edn.)

**N213 Anatomy and Physiology of Farm Animals**

**Module coordinator: Mr Charles Maika**

**Module description**
This module covers the principles of mammalian physiology and applied anatomy in relation to farm animals. The integration and control of all major organ systems, including endocrine, nervous, musculoskeletal, digestive, cardiovascular, respiratory, renal and immune systems will be studied, from the micro anatomical level, through to gross anatomy and normal physiology. In addition, students will learn about the importance of blood, cellular communication and the principles of thermoregulation. Central to this subject is the focus on homeostasis and the linkages between each of the organ systems in maintaining homeostasis. Examples from a variety of farm animals are used to demonstrate and assimilate concepts in lectures and practical classes. Students are required to study different organs and systems of an animal’s body (i.e. ruminant or non-ruminant)

**Learning Outcomes.**
By the end of the module students will be able to:
1. Define and use anatomical terms.
2. Locate and identify parts of the anatomy of farm animals.
3. Compare and contrast the normal anatomy and physiology of the major organs and systems of various species.
4. Describe the biological role of the major animal cell and tissue types.
5. Describe the function of various physiological systems.

**Module delivery**
100 hours comprising 20 hours lectures, 15 hours practicals, and 65 hours self-study.

**Assessment**
Coursework 40%: Exam 60%

**Essential Reading**

**N214 Mono-gastric Animal Production**

**Module coordinator: Mr Limai Lan**

**Module description**
This module introduces students to mono-gastric animals including swine and poultry. It teaches students how these animals can be raised using limited land area, with low cost. The module includes: the characteristics of mono-gastric animals, breeds of pigs and poultry, enterprise development, breeding stock management, housing and equipment, nutritional requirements and feed formulation, diseases and parasites.

**Learning Outcomes.**
By the end of the module students will be able to:
1. Recognise the main components in swine and poultry production systems
2. Describe the reproductive systems of monogastic animals
3. Recognise the main differences between broiler and layer rearing systems  
4. Formulate appropriate feeds for swine and poultry.  
5. Identify the main diseases and parasites of swine and poultry  

Module delivery  
100 hours comprising 20 hours lectures, 20 hours tutorials and practicals and 60 hours self-study.  

Assessment  
Coursework 40%; Exam 60%  

Essential Reading  

N222 Animal Production  

Module description  
This module provides students with a practical understanding of animal production practices and systems. This module is designed to cover husbandry and management practices of the major livestock animals including; sheep, goat, cattle, rabbit, pigs, ducks and chickens. It covers the following topics: The importance of animal husbandry for livestock animals. The physical environment and animal production practices. Animal production systems housing, shelter and design. Essential farm production records. Feeding and management of farm animals. Breeding management and applications of mating systems. Animal health and welfare of important farm animals. Care and management of young animals. Management of beef cattle. Livestock integration practices and systems

Learning Outcomes  
By the end of the module students will be able to:  
1. Describe the main animal production systems in use today.  
2. Explain the advantages and disadvantages of different main types of commercial livestock facilities

N225 Ruminant Animal Production  

Module coordinator: Ms Kathleen Diapong Patak  

Module description  
The Ruminant Animal Production module provides students with a general understanding of the husbandry and management principles of ruminant animals for production purposes. The fundamental concepts of animal behaviour, breeding, nutrition and feeding, health and welfare as well as a range of field or management practices for cattle, goats, sheep and buffalo are covered. The module covers: An overview of the beef industry in Papua New Guinea. Breeds and characteristics of ruminant animals. Management of ruminant breeding stock. Housing and equipment for ruminant production. Feeding principles in ruminant animals. Grazing management (adult equivalent and herd composition, stocking rates and carrying capacity). Disease and health care of ruminant animals. Ruminants and their impacts on climate change
Learning Outcomes.
By the end of the module students will be able to:
1. Describe importance of cattle, buffalo, sheep and goat production in PNG.
2. Explain the management principles involved in the rearing of ruminant animals. The age at puberty, sex ratio, care of the young ruminants, reproductive cycle etc.
3. Compare and contrast the anatomical structure of the gastro-intestinal tract of ruminant animals.
4. Describe appropriate housing types for the different classes of ruminant animals.
5. Evaluate the sustainability of different farming systems.

Module delivery
100 hours comprising 10 hours lectures 30 hours tutorials, practicals and field trips and 60 hours self-study.

Assessment
Coursework 50%: Exam 50%

Essential Reading

N226 Pasture production and management
Module coordinator: Ms Kathleen Diapong Patak
Module description
This module teaches students the fundamentals of pasture production and management. It includes terminology, requisite practices and applications to equip them to make sound pasture management decisions and to be sensitive to the need for maximizing the use of forages for a profitable ruminant enterprise. This module will introduce students to: Pastures, pasture plants and pasture varieties both native and introduced pastures as well as legumes and fodder crops used in ruminant grazing systems. Farming and Grazing Systems.

N(D)311 Animal Nutrition
Module coordinator: Ms Kathleen Diapong Patak
Module description
The module covers the basics of ruminant and non-ruminant nutrition in the tropics. It deals with the components of foods - the animal and its food, water, dry matter and its components, analysis and characterisation of foods, classification and functions of nutrients, nutrient sources and uses, deficiency symptoms, the digestion and metabolism of nutrients, digestive processes, nutrient requirements of animals, characterization of feedstuff and feed formulation techniques.
Learning Outcomes.
By the end of the module students will be able to:
1. Explain the scientific principles of animal nutrition.
2. Determine the essential nutrients and energy requirements of agriculture animals.
3. Quantify the composition of nutrients and the absorption of food in the digestive system of animals.
4. Select the appropriate analytical tools to evaluate various animal feeds.

Module delivery
100 hours comprising 14 hours lectures, 26 hours tutorials, practicals and field visits and 60 hours self-study.

Assessment
Degree Coursework 50%: Exam 50%
Diploma Coursework 60%: Exam 50%

Essential Reading

N(D)312 Feed Analysis & Instruments
Module coordinator: Mr Freddy Gena

Module description
This module provides theoretical and practical experience of how to collect and prepare samples using different analytical equipment. The knowledge and skills acquired through this module will prepare students for future employment opportunities in laboratories, feed industries, animal production and allied Industries.

Learning Outcomes.
By the end of the module students will be able to:
1. Define and apply the different terms used in animal nutrition
2. Identify and state the functions of different equipment and reagents used in the laboratory
3. Identify and apply standard laboratory procedures and safety rules
4. Conduct proximate analysis and determine nitrogen and crude protein of ingredients by Kjeldahl Method
5. Handle and operate centrifuge, electrical pH meter, litmus paper, Vernier caliper and yolk fan

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials, practicals, field visits and 60 hours self-study.

Assessment
Degree Coursework 40%: Exam 60%
Diploma Coursework 50%: Exam 50%

Essential Reading

N(D)313 Animal Health Management
Module coordinator: Mr Charles Maika

Module description
This module teaches students to recognize and prevent diseases in farm animals. It includes: animals and their environment, nutrition and animal health, sanitation and disease control, disinfection and disinfectants, vaccination and immunization, quarantine in disease control, animal housing and health, hereditary factors and abnormalities, animal health and disease surveillance, miscellaneous diseases of farm animals (metabolic and deficiency diseases, plant and chemical poisonings), parasites and their control.

Learning Outcomes.
By the end of the module students will be able to:
1. Explain the importance of animal health and quarantine, disease recognition, and reporting in the prevention of disease.
2. Define the terms: exotic disease, endemic disease, infectious disease, and zoonotic disease, infectious agents.
3. Describe effects of internal and external parasites on farm animals.
4. Make recommendations on best management practices to avoid diseases and production losses on farm.
5. Identify abnormalities in cell, tissue and organ functions.

Module delivery
100 hours comprising 20 hours lectures, 20 hours tutorials, 20 hours practicals, and 60 hours self-study.

Assessment
Degree Coursework 50%: Exam 50%
Diploma Coursework 60%: Exam 40%

Essential Reading

ND321 Applied Animal Nutrition

Module coordinator: Ms Kathleen Diapong Patak

Module description
This module covers practical applications of animal nutrition; feedstuff and their properties, feeding behaviour and water requirements, feed manufacturing and feeding and nutrition of livestock and quantifying the nutrient content of foods. It will start with the basic principles of nutrition: digestion and metabolism of nutrients, and progress on to how these can be applied to the feeding of farm animals. The module will develop the principles of nutrient requirements, the need for feed evaluation systems and formulation of rations for the different production stages of these species, such as growth, lactation or egg production. The consequences of inadequate nutrition on health, welfare and productivity will also be outlined.

Learning Outcomes.
By the end of the module students will be able to:
1. Evaluate formulated feeds and measure their effects on growth performances or production stages of farm animals through improved feeding systems
2. Explain the impacts of recent developments in monogastric and ruminant nutrition in Papua New Guinea and the Pacific on food security in the region.
3. Formulate an appropriate animal feed for a range of livestock species of different ages.
4. Diagnose a problem within the livestock feed industry.

Module delivery
100 hours comprising 8 hours lectures, 22 hours tutorials, practicals, farm and field visits and 70 hours self-study.

Assessment
Degree Coursework 50%: Exam 50%
Diploma Coursework 60%: Exam 40%

Essential Reading
3. Use data (from their experiments or from the literature) to present a coherent argument.
4. Discuss ethical implications of animal production methods.
5. Describe scientific indicators of stress in animals and explain how correct housing and management contribute to animal welfare.

Module delivery
100 hours comprising 20 hours lectures, 32 hours tutorials, practicals, field trip and 48 hours self-study.

Assessment
Degree Coursework 40%: Exam 60%
Diploma Coursework 50%: Exam 50%

Essential Reading

ND324 Meat Quality and Assessment
Module coordinator: Mr Limai Lan
Module description
This module provides students with the fundamentals of quality meat processing and packaging. It includes: abattoir practice, red meat inspection, slaughter and dressing, anatomy, pathology, diseases and conditions, meat inspections, meat hygiene, quality assurance.

Learning Outcomes.
By the end of the module students will be able to:
1. Perform a quality assessment of a meat processing plant using meat industry regulations.
2. Work as part of a team to slaughter and process various farm animals.
3. Use good hygiene practices during ante-mortem and post-mortem inspections of various farm animals.
4. Perform lab microbial analysis on processed red meat.
5. Describe the waste handling and disposal practices of the processing plant sites.

Module delivery
100 hours comprising 20 hours lectures, 32 hours tutorials, practicals, field trip and 48 hours self-study.

Assessment
Coursework 40%: Exam 60%

Essential Reading
N413 Climate Change & Animal Agriculture  
*Module coordinator: Mr Freddy Gena*

Module description
This module will enable students to understand what climate change is, its impacts and its solutions both on a national and global scale. The module will prepare students to take an active role in making sustainable and environmentally friendly management choices for the benefit of the people, business, environment and the world as a whole. The module includes: an introduction to climate science, the global and national impacts of climate change, animal agriculture and its contribution to climate change, adaptation to climate change, climate change mitigation, the World’s response to climate change

Learning Outcomes.
By the end of the module students will be able to:
1. Define and apply the different key terms used in animal production and climate change.
2. Analyse and evaluate the impacts of climate change at global, regional and national level in reference to natural resources, societies, industries and lives of people.
3. Identify and evaluate responses to climate change under mitigation and adaptation strategies by PNG government and the global community
4. Investigate and identify the core components, drivers and causes of climate change.
5. Propose, articulate and defend an animal production system that can cause little or no harm to the environment and thus minimize climate change.

Module delivery
100 hours comprising 20 hours lectures, 40 hours tutorials, practicals, field visits and 40 hours self-study.

Assessment
Coursework 40% Exam 60%

Essential Reading

N421 Livestock Integrated Farming Systems  
*Module coordinator: Mr Gerald Enda*

Module description
This module introduces students to livestock-crop integration. It describes how sustainable agricultural concepts utilize limited land resources with vertical integration becoming important for the growing population. It outlines current challenges to agriculture including avoiding the problems arising from decades of using farming practices with high environmental impacts, mitigating emissions of greenhouse gases, reducing erosion and loss of fertility of soil and water pollution, among others. Integrated crop livestock system are considered to be key among sustainable technologies to achieve the goals.

Learning Outcomes.
By the end of this module students will be able to:
1. Define and describe an existing integrated farming systems
2. Design an integrated farming systems of a developing country
3. Compare and Contract integrated and non-integrated farming systems
4. Analyse the components of an integrated farming systems and identify any associated problems

Module delivery
100 hours comprising 20 hours lectures, 21 hours tutorials, practicals, field trips and 59 hours self-study.

Assessment
Coursework 40%: Exam 60%

Essential Reading
Rana, S. S. (Ed.), Integrated Farming System Book. Department of Agronomy, CSKHPKV, Palampur

https://www.researchgate.net/publication/309211392_Integrated_Farming_System

N422 Animal Breeding
Module coordinator: Mr Freddy Gena
Module description
This module provides skills in developing selection criteria and breeding objectives, breeding programs and conservation techniques. The module includes: introduction to genetics and breeding, selection, mating systems, factors affecting the rate of genetic change – heritability and generation interval, genes in populations, dealing with multiple traits, biotechnology in animal breeding, breeds and animal genetic resources.

Learning Outcomes.
By the end of the module students will be able to:
1. Define and apply key terms used in genetics and animal breeding.
2. Identify and evaluate quantitative traits of animals and determine i) which traits are of greatest economic importance. ii) the genetic relationship (correlation) between the traits and iii) the simplest effective method of measuring / collecting data.
3. Solve relevant genetics and animal breeding problems.
4. Observe and judge animals to determine their general health status and breeding soundness.
5. Identify the different biotechnological techniques used in animal breeding and evaluate their ethical and cultural implications based on PNG culture and beliefs.

Module delivery
100 hours comprising 20 hours lectures, 36 hours tutorials, practicals and field visits and 44 hours self-study.

Assessment
Coursework 40% Exam 60%

Essential Reading
Bourdon, R. M. (1970), Understanding animal breeding (2nd Edn.). Prentice-Hall.
Lawrence, T. J., Fowler, V. & Novakofski, J. (2012), Growth of farm animals (3rd edn.), Oxfordshire

N424 Animal Reproduction
Module coordinator: Mr Freddy Gena
Module description
A thorough understanding of animal reproduction is important to minimise losses at the reproductive stage. This module includes: anatomy, physiology of reproduction, endocrine reproduction, reproduction cycle, pregnancy diagnosis, pregnancy and birth, lactation and milk secretion glands, reproduction behaviour, reproduction nutrition

Learning Outcomes.
By the end of the module students will be able to:
1. Describe the anatomy & physiology of farm reproductive system and hormonal functions.
2. Control the reproduction and breeding of farm animals.
3. Respond to reproductive behaviour of farm animals.
4. Develop dietary needs of farm animals to maintain optimum fertility of reproductive organs.
5. Diagnose and monitor successful pregnancies of farm animals.

Module delivery
100 hours comprising 20 hours lectures, 36 hours tutorials, practicals and field visits and 44 hours self-study.

Assessment
Coursework 40%: Exam 60%

Essential Reading
Lawrence, T.J., Fowler.V & Novakofski.J (2012), Growth of Farm animals (3rd edn.), Oxfordshire
Sutherland, J.H., (1967), Understanding Farm Animals: An introduction to the science of animal reproduction, Angus and Robertson
Tourism
T121 Introduction to Tourism
Module coordinator: TBA
Module description
Tourism is the largest industry on earth. Within our region tourism is already an important source of foreign revenue. However, it has considerable scope for expansion and must be regarded as an industry in its infancy. Unfortunately, the potential for tourism to grow within the region may be compromised by conflicts between its needs and the needs of other rural and marine industries which are studied by UNRE students. The focus of this introductory module is on the conflicts that occur, between agriculture, forestry, fisheries and the fledgling tourism industry. The module covers the diversity of the tourism industry, the history of the tourism industry, regional and social differences in the tourism market, what tourist want and what they don't want, conflicts between rural and marine industries, conflicts between industry and our rural communities, sustainability of markets, PNG's global image and marketing our products, constraints on the growth our regional industries, StaRs Vision 2050 and the future.

Learning Outcomes
By the end of the module students will be able to:
1. List the main types of tourism that occur within and outside the region;
2. Discuss the historic development of the tourism industry in different regions;
3. Describe the main areas of conflicts between tourism and other regional industries;
4. Identify how “the PNG brand” helps and limits the marketing of our products;
5. Describe how our regional industries may work together for mutual benefit.

Module delivery
100 hours per semester comprising 20 hours lectures, 10 hours tutorials, 70 hours self-study.

Assessment
Coursework Assessment 50% (review article):
Exam 50%

Essential Reading List
Forest tourism and recreation: case studies in environmental management
SECTION F UNRE Teaching Definitions, Roles and Responsibilities

UNRE Management Team
The Senior Management of UNRE

PVC Academic
Pro Vice Chancellor Academic & Planning

UNRE Academic Board / Exam Board/ Senate
This body is chaired by the VC or PVC Academic, and its membership includes ALL UNRE academic members of staff. The Board meets to approve student marks, progression and degree classifications. It takes into account evidence of students with special circumstances and cases of unfair practice. This body also receives reports from our External Examiners. It is responsible for overseeing Departmental responses to External Examiners Reports and looking for any common concerns and examples of good practice.

Learning and Teaching Committee
This body is chaired by the VC or PVC Academic, and its membership includes ALL UNRE academic members of staff, with additional representation from other groups, such as technical staff, the library and students. The Learning and Teaching Committee is a body for discussing, amending and approving learning and teaching policies and procedures. Standing items on the agenda should include: reports from the SRC and departmental SSLCs, reports from the Teaching and Learning Methods Unit and ideas for new modules and course changes (approved concepts are subsequently developed under the guidance of the relevant Head of Department and then submitted to the PVC Academic). Where possible, the L&TC should arrive at a consensus, agreeable to all in attendance. However, silence in the face of a forceful pronouncement by a figure of authority should not be assumed to indicate that a consensus has been reached. Thus, voting by show of hands provides as an integral part of the L&TC a quick method to allow all members to express an opinion for or against a proposal. However, new and revised regulations may require subsequent approval by UNRE Management Team and the Council of the University. At the end of each academic year a special meeting of the L&TC is responsible for receiving and discussing all annual module and course review documents, looking for any common concerns and examples of good practice. Meetings of this Committee MUST be formally minuted.

External Examiners
At least one External Examiner (a senior relevant academic from another University with no recent affiliation with PNG-UNRE) should be present at our Academic Board. External Examiners should be appointed on a four year term. They should be recommended by the Academic Department and their appointment approved by the PVC Academic. External Examiners are responsible for producing an annual report on our courses. An External Examiner may be responsible for reporting on more than one of our courses, if their expertise is considered appropriate by the PVC Academic.

Teaching and Learning Methods Unit
The function of this unit is to mentor new academic staff in the teaching QA structures and systems described in this document and provide training in tertiary level teaching. The TLMU also offers continued professional development opportunities for more experienced members of staff and provides a forum for sharing good practice. The TLMU should support new members of staff by appointing both a teaching and a research mentor.

Special Circumstances Reports
Students with exceptional circumstances, e.g. extreme medical problems, or genuine,
unforeseen personal circumstances such as illness, family problems or death of a close relative, may bring such information to the attention of the University, by submitting an appropriate form and providing independent supporting evidence. These circumstances may be fully taken into account by granting an extension on the coursework deadline or setting an alternative assessment. However, these forms may also be considered by the Academic Board and if considered appropriate the Board may raise borderline marks if they are within 2% of a class boundary.

**Student Disciplinary Committee and Unfair Practice**

A panel of staff comprising the staff member setting the work, the year coordinator and the course coordinator, will adjudicate on whether unfair practice has occurred in the completion of that work. The outcome of their deliberations (mark penalty) is reported to the Academic Board. This is an academic decision so there is no right of appeal.

In cases where a student or group of students are accused of inappropriate behaviour, their case will be reviewed by a panel of staff comprising their personal tutor, the year coordinator and Head of Department. The outcome of their deliberations (mark penalty) is reported to the Academic Board. There is a right of appeal in this case to the PVC Academic.

The Student Disciplinary Committee has the responsibility for enforcing the regulations defined in the Student Rule Book 2018 and must only apply the penalties that it prescribes.

**Student Representative Council**

This body is chaired by the PVC Academic and the Student President of the SRC. Its membership includes the Vice Chancellor, the elected Student Representatives, the Heads of ALL Academic Departments and representatives of other groups as required such as IT, Estates, the Library. The function of this body is to provide a forum for students to raise University wide concerns and discuss with the management how these may be resolved. This Committee should meet three times each Semester.

The SRC is also tasked with nominating the best lecturer and best module handbook of the year, so that the Teaching and Learning Methods Unit can disseminate examples of good practice.

The SRC should be allocated an annual budget by the Bursar to be spent supporting student centred activities on campus. The allocation of this budget is dependent on the SRC, presenting annual audited accounts and documenting their expenses.

**Staff Student Liaison Committee (SSLC)**

Each Academic Department should organise its own SSLC, chaired by the Head of Department. Membership includes elected Student Representatives from the department; one from each year group, plus the year coordinators and a member of support staff from the Department. The function of this body is to provide a forum for students to raise Department and Course issues and discuss with the department how these may be resolved. This Committee should meet twice each Semester.

Democracy and the Learning and Teaching Committee:

When does the L&TC meet?

- At least three times in the year.
- A week before each semester begins and at end of the academic year.
- Additional L&TCs may be called by the PVC Academic to discuss urgent issues.

When should votes be held?

- Whenever a draft learning and teaching policy or procedure requires approval by the L&TC.
- Whenever an amendment to a draft learning and teaching policy or procedure is proposed and seconded by members of the L&TC.
- Whenever a motion to refer a learning and teaching policy or procedure back...
to the L&TC for revision is received from the PVC Academic.

Procedure for debating and voting

- A motion to approve, amend or refer a policy or procedure should be proposed by a member of the L&TC and seconded by a different member of the L&TC.
- The proposer should make a single, brief argument in favour of the motion.
- Other members of L&TC may each make a single, brief argument (<5 minutes) for or against the motion or ask a single question.
- After everyone who wishes to speak has done so, the proposer of the motion may answer any questions asked by other members of L&TC and make brief replies to any comments.
- Other speakers may request a single opportunity to reply briefly to comments directly relating to their suggestions.
- The motion will normally be put to a vote by show of hands. A teller will be appointed to count votes for and against and those abstaining. The results of the vote will be entered in the L&TC minutes.
- Under exceptional circumstances, any member of L&TC may request a secret ballot. Ballot papers will be issued to all L&TC members present and marked papers will be deposited in a box. The results of the vote will be entered in the L&TC minutes.
- Normally, a motion is passed if it receives the support of a simple majority of the L&TC meeting. In cases where changes to the composition or standing orders of the L&TC are proposed, a two-thirds majority is required.

Academic Departments

- Academic departments are responsible for drafting new and revised modules and course documents following approval of the L&TC and submitting the required documents to the PVC Academic for consideration.
- Academic departments are responsible for holding two SSLC per semester and reporting these to the L&TC.
- Academic Departments are responsible for the Quality Assurance of Coursework Briefs and Exam Questions. These should be checked for clarity, and to ensure that the appropriate Learning Outcomes are being assessed. OLD EXAM QUESTIONS SHOULD NOT BE ROUTINELY RECYCLED. Year 3 & 4 exam questions should be sent to an External Examiner for approval before the exam.

Personal tutors

At the beginning of the first semester, all new first year students will be assigned by the Head of Department to a personal tutor within the Department. Personal Tutoring is an important element in enabling students new to the University to settle into their studies and to have an initial point of contact for any personal, academic or other matters that might impact upon their student experience.

The primary roles of personal tutors are to:

- Support the academic development of tutees
- Provide pastoral support for tutees if required

In addition, UNRE tutors may be called upon to teach and/or assess their tutees if they are registered on certain modules. Tutors are expected to meet with all their tutees in all year groups, at least once per semester, either as a group, or as individuals.

Tutors and Pastoral Care

Tutors may be asked by their tutees to provide references for job applications, to offer guidance on filling out special circumstances forms, or to explain how resits and progression operate. It is therefore important that students feel comfortable raising such issues with academic staff. Tutors
are NOT expected to solve students’ personal problems, but to help direct them to more appropriate people who can help such as Student Support Services.

**Module Leaders**

All modules must have a UNRE academic member of staff identified as the module leader, even in cases when the module is delivered by people from outside our Institution. The job of the module leader is to ensure that our QA procedures are followed and that the required documents are available on time in the standard UNRE format. The common UNRE format for a module includes at least a:

- Description of the module and its learning outcomes.
- Timetable of activities (lectures, seminars, practical classes etc.) within the module.
- Clear coursework brief, (if assessed by coursework).
- Module course-book of supporting materials including a reading list.
- Health and safety guidance for any practicals and field trips

**NB Much of this information is defined in the MAF (Module Approval Form) and a summary is included in this handbook.**

Coursework briefs require a standard UNRE coversheet which enables the work to be marked anonymously. It should include a brief module description, list the learning outcomes covered in the assignment, identify the module coordinator and coursework coordinator, the proportion of marks allocated to the coursework, the due hand-in date and the UNRE policy on late submission of coursework.

Module leaders are responsible for submitting coursework and exam marks and mark moderation forms promptly to the departmental office and checking their accuracy. The academic department is responsible for forwarding these marks to Academic and Student Administration within three days.

Approaching the end of each module’s teaching delivery, module leaders are required to survey student feedback using the standard forms. This student feedback and analysis of marks, provides the backbone of the module review process, which module leaders are required to complete at the end of the academic year and before the external examiners arrive for the final exam board. Module leaders are responsible for ensuring that this year’s version of the above documents and samples of this year’s student work are stored in the departmental office. These records are kept to allow External Examiners or Quality Auditors to review our teaching provision, quickly and easily before exam boards. Thus, files should be completed shortly after the end of semester. These box files should contain:

- Definitive list of students on the module,
- Module descriptions,
- Module timetables,
- Coursework Briefs,
- Module Handbook,
- Copies of mark sheets and mark moderation forms,
- Photocopied samples of course work, representing the full range of marks awarded: at least one example per degree class,
- Copies of all risk assessment forms associated with practical classes or field visits and the annual module review form.

At the end of the academic year the box contents will be archived, but the intention is that we will keep the most recent module review forms in the box to enable a longer term view to be taken.

**Module Handbooks and Reading lists**

- ALL Module Handbooks should be available electronically at the start of the semester.
- All books, journals and articles on module reading lists should be
available through the university library, or available electronically.

- Reading lists should be available to students at least four weeks before a module commences.
- Reading lists should follow a standard structure throughout the university and be listed under two main headings, essential and further.
- There should be a minimum of five and a maximum of fifteen items on a module reading list.

Policy / good practice needs to be agreed at Learning and Teaching Committee.

Heads of Department

UNRE Heads of Department are budget holders. They must present an annual report to the UNRE Management team at the annual planning round meeting. This must include a request for a budget for the year ahead. This report should include a case for support statement requesting funds for any new initiatives. The allocation of subsequent budgets are dependent on the department staying within budget, and returning annual audited accounts documenting their expenses.

The Head of Department is responsible for the academic development and direction of the department. Their role includes; line-managing the academic staff, encouraging their teaching and research activity, developing a training policy for the department. They must take an active role in identifying the need for new academic staff and be involved in the recruitment process.

Course Leaders (Heads of Department)

UNRE Heads of Department are designated as course leader. Unless there is more than one course within a department in which case there may be a separate course coordinator.

Overview Course leaders are required to be responsible for the general administration of our degree programmes, to act as “go-betweens” between students and the University and to provide the departmental office with relevant information about students on their course. A course leader has the support of year coordinators. The main role of this team is to ensure the smooth running of the course (from recruitment, to graduation) and to be a point of contact for student feedback regarding problems that are wider than an individual module through the SSLC.

Main roles/activities:

- Brief new first year students at the beginning of the academic year –
  Give an introduction of the course structure, modular system, registration, medical questionnaire, and Health, Safety Policy and Practice. Course leaders should stress the importance of attending lectures and handing coursework in on time, and the purpose of the UNRE student handbook.

You should explain the UNRE marking criteria and how final course marks are calculated.

- Meet with all year groups of students near the start and end of each semester. At the start you should review their timetable. Check beforehand for any potential problems. Similarly you should review their hand-out and hand-in timetable for coursework, and try and avoid extreme pressure points by discussion with relevant module leaders. Explain progression rules, remind students about the value of module handbooks. Seek nominations for representatives on the departmental SSLC.

- You may wish to have a follow up meeting with first year students to re-emphasise these points and check
they have settled in well a few weeks into term.

- An additional meeting should be held at the end of the first semester with each year group in order to review the term and discuss the forthcoming exams.
- Review Semester 1 marks (along with the Assistant Registrar Academic and Student Administration (ASA) check and identify students who cannot progress.
- Attend the Exam Board and present the marks of students on the course.
- At the end of the academic year hold a course meeting with each year group to explain when and how marks will be sent out (Student Record).
- With the Assistant Registrar (ASA) explain to the students how they will be contacted about resit and progression regulations and procedures.
- Review Semester 2 marks for all years and check (with ASA) referral indicators with the Marks Officer. Attend the Exam Board and go through each year cohort.
- Compile course material for external examiners visit – cohort analysis, copies of conventions and progression rules, annual course monitoring report, breakdown of the marks of each final year student, decisions on borderline marks and recommended progression route.
- Attend Exam Board and go through marks.
- Check marks (with ASA) of resitting students and decide if they are allowed to re-join the course.
- Before the academic year, chair a course review meeting with all relevant module leaders to discuss module reviews and action points. Review course student questionnaire feedback from end of last academic year and discuss any course action points. Develop an assessment timetable for each semester for each year group to avoid activity/assignment hand in date clashes and even out the student workload as much as possible.
- Promote UNRE degrees and be involved in student recruitment activities.
- Throughout the year, respond to enquiries about the course and liaise with UNRE admissions. Meet with potential candidates.

**Student Attendance Monitoring.**
Academic staff are required to ask students to sign a register for all timetabled activities. This is partly for health and safety reasons (to ensure all students return from field visits etc). Signing the name of another student on the register is an offence. Registers will be filed and summary data produced at the end of the academic year to assist staff in writing references for students.

**Peer Observation of Teaching**
UNRE expects all academic staff to engage in a rolling programme of peer observation of teaching. Peer observation is an integral part of probation for new staff, plus it is widely seen as good practice for all staff. There is a Peer Observation of Teaching Form available to help guide this process and staff are encouraged to identify examples of good practice to feedback to the Peer Observation Coordinator. However, it must be stressed that the form’s contents are entirely confidential to those directly involved, and the process is not designed to be part of the annual performance review or any disciplinary action.
Health and Safety and Risk Assessment
UNRE has an obligation to look after the health, safety and welfare of all its staff and students. Academic staff are required to complete a UNRE Risk Assessment Form for all non-classroom activities. These include visits, field visits and laboratory practicals. Guidance on completing these can be provided by the University Health and Safety Officer. Once completed, the risk assessment form should be kept in the module record box in the departmental office and form part of the module handbook.

Health Issues and Field Work
If we are to look after the health and welfare of our students it is important that we are aware of their current health status, before they are allowed to carry out certain activities such as field work. It is the students’ responsibility to bring any known significant health issues to the attention of the module leader at the start of the module. If these issues are of a personal nature, the student may communicate with the Head of the UNRE Ethics Committee.

SECTION G: ASSESSMENT AND FEEDBACK
Assessments normally consist of two components; coursework and final examination. An overall mark of 50% with a minimum mark of 40% in each component is required to pass each module.

Coursework submission, return of marks, moderation and feedback
Student coursework should be submitted anonymously through the department office. Submitted coursework will be date and time stamped by the department and a receipt issued to the student. Work handed in late will be awarded a mark of ZERO and will result in the student failing the module, since students must obtain minimum scores of 40% in both the Coursework and examination, as well as scoring 50% overall in order to pass each module.

All coursework will be marked and returned to the student (via the departmental office) within A THREE WEEK PERIOD. Students will only be allowed to collect their marked coursework if they provide some form of identification.

Feedback from members of staff should be clear, it should be consistent with the UNRE marking criteria and provide recommendations on what the student needed to do to improve their mark.

A sample of coursework from across each grade boundary should be moderated (checked) by a second member of staff. All failed coursework should be checked by a moderator. The moderator should document this process by completing a coursework moderation form. If the distribution of marks gives cause for concern, with the average mark being very high or very low the marks must be approved by the Head of Department BEFORE being released to the students. Class marks giving cause for concern may only be adjusted as a class set with the agreement of the marker, moderator and Head of Department. INDIVIDUAL MARKS CANNOT BE ALTERED BY A MODERATOR. Once the marks have been agreed and the work de-anonymised, the class set of marks should be entered into a table and returned to the departmental office.

Student oral presentations, should be marked independently by two members of staff and an agreed mark and agreed set of feedback comments provided to the student after the session.

Setting Exam Questions, Exam Rubric and Marking Policy
Writing exam questions is the responsibility of the academic member of staff. Exam questions should be clearly written in easy to
understand English. Outline answers should be provided which should enable another member of staff to mark the exam paper if required. The exam paper must cover all the associated Learning Outcomes. It is the responsibility of the HoD to check the exam papers for: clarity, to avoid the reuse of last year’s questions and to ensure that the assigned LOs are covered. This process should be documented on a Draft Exam Form. The standard UNRE exam rubric, must be used which describes the number of questions that should be answered (e.g. 2 from a choice of 4), and the duration of the exam. In cases where students answer more than the required number of questions (unless answers have been clearly crossed out), then all questions attempted will be marked and the marks that are most advantageous to the student will be used in the calculation of the final exam mark.

Examinations
There is an examination week at the end of each semester. Failure to attend an exam will be recorded as a fail, unless the candidate has formally withdrawn from the module (see below).

Withdrawal
Where exceptional circumstances arise, a candidate, with the approval of his or her Head of Department, can withdraw in writing to the Registrar from the study of a module or modules. If this is done not less than five full weeks before the examination week, he or she shall not be recorded as having failed in that module. The candidate may then present themselves for examination in a future semester.

Plagiarism
Plagiarism occurs when you copy or reproduce someone else’s words or ideas and then present them as your own without proper acknowledgement. It is a form of cheating. Penalties for plagiarism are severe and include failure in the module(s) and may lead to termination of your studies.

Failed Modules and Regulations on Academic Progress
Candidates must pass all the modules in a semester in order to proceed to the next semester or graduate (One condoned module is allowed in years 1 and 2 – see below). Students failing one module must repeat and pass the failed module before proceeding to the next stage of the course. Students failing two modules in an academic year shall be discontinued from the course. They may apply to resume their studies, but their readmission will be subject to approval by the Registry and the Department. Such candidates would be required to enrol in all modules for which they scored grades lower than credit (2). A candidate may appeal against their discontinuation. The appeal should be made to the Pro Vice Chancellor Academic within seven days of receiving the discontinuation letter.

Calculation of Final Year Grades and Degree Progression Rules 2018

Year 1 Progression

• Average end of year marks are calculated as percentages (not grade points).
• Progression into year two is based on passing the first year with an average mark above 50%.
• One failed module (condoned) with a mark between 40 and 49% can be carried (no need to re-sit) but not in a MUST PASS MODULE.
**MUST PASS MODULES:**

<table>
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<tr>
<th>Tropical Agriculture</th>
<th>Fisheries &amp; Marine</th>
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<tr>
<td>A111</td>
<td>M111 Introduction</td>
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<tr>
<td>Communication skills</td>
<td>to fisheries</td>
</tr>
<tr>
<td>A112 Biology</td>
<td>A111 Communication</td>
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<tr>
<td>A115 Introduction</td>
<td>skills</td>
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<td>to agriculture</td>
<td>A112 Biology</td>
</tr>
<tr>
<td>A126 On farm practice</td>
<td>A114 Chemistry</td>
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<td></td>
<td>A129 Physical</td>
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<td></td>
<td>Science</td>
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<tr>
<th>Livestock Production</th>
<th>Forestry</th>
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<tbody>
<tr>
<td>A111</td>
<td>A111 Communication</td>
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<tr>
<td></td>
<td>F111 Introduction</td>
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<tr>
<td></td>
<td>to Forestry</td>
</tr>
</tbody>
</table>

**Year 2 Progression**

- **Degree/ Diploma Progression** is determined at end of year 2
- Students can carry one failed module (condoned) with a mark between 40 and 49% (with no need to re-sit)
- Students with average marks of 50% or above at the end of year 2 can leave the course with a diploma.
- Students with average marks between 50 and 64% progress to advanced diploma.
- Students with marks of 65% or above progress to the degree course.

**Year 3 Progression**

- End of year 3 diploma students with average marks of 50 % or above can graduate with an Advanced Diploma.
- Students failing to meet this standard can graduate with a Diploma.
- End of year 3 diploma students with average marks of 65% or above can, if they wish progress directly into the final 4th year of the degree.
- End of year 3 degree students can progress into year 4 if they achieve an average mark of 50% or above.
- Degree students with marks between 40 and 49% can graduate at the end of year 3 with an Advanced Diploma
- Degree students failing to meet this standard can graduate with a Diploma
- Graduating Advanced Diploma students with marks between 50 and 64% may return after a year’s relevant industry experience and enter the final year of the degree only if they pass a two-week bridging course before the start of the semester.

**Final Degree Classification**

- Only final year marks are used in the classification of degrees.
- Marks are calculated as percentages (not grade points).
- Average marks above 75% are awarded MERIT.
- Average marks above 85% are awarded DISTINCTION.
**SECTION H: Marking Criteria**

<table>
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<tr>
<th>Mark %</th>
<th>Grade</th>
<th>Marking criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-100</td>
<td>4</td>
<td>The work presented should be factually close to faultless and well-focused on the task set. The text should be structured in a very clear logical way. There will be excellent coverage of the topic and extensive evidence of supplementary reading. Reliable evidence should be presented to support the statements made.</td>
</tr>
<tr>
<td>75-84</td>
<td>3</td>
<td>The work presented will be a high standard, clearly focused and relevant to the task set. The text should have a logical structure. There will be some evidence of supplementary reading. Some evidence should be used to support the statements made.</td>
</tr>
<tr>
<td>65-74</td>
<td>2</td>
<td>The work will be factually correct and broadly focused on the task set. The work will be structured in a mostly logical way. There will be some evidence of outside reading and presentation should be reasonably clear. Some evidence should be provided, but it may not be entirely relevant.</td>
</tr>
<tr>
<td>50-64</td>
<td>1</td>
<td>The work will be accurate but limited in depth of coverage. There may be some errors or key facts missing or misinterpreted. Presentation or organisation may hinder communication of the material. Relevant evidence may be limited.</td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>Information will be sparse or inaccurate but broadly relevant to the question. The work will lack depth of coverage. Presentation or organisation will hinder communication of the salient material. Little relevant evidence will be provided.</td>
</tr>
<tr>
<td>20-39</td>
<td>0</td>
<td>The work presented will be poorly directed at the question. There will be many omissions or errors but some relevant facts will be correct. The work will lack convincing demonstration of understanding. The material will be largely irrelevant to the task set with many omissions and / or errors. Organisation will be poor.</td>
</tr>
<tr>
<td>19-0</td>
<td>0</td>
<td>The work will be lacking in length or irrelevant to the question. There will be little substance or factual material presented. There will be almost no relevant or correct material included.</td>
</tr>
</tbody>
</table>

Sometimes answers may contain elements that fit the description for more than one of the above grade descriptions. The mark awarded will be based on the markers subjective assessment of which description best matches the overall standard of the work.
SECTION I: UNRE Quality Assurance Structures

Teaching Structure

UNRE Management Team

PVC Academic

Student Representative Council

Academic Board / Exam Board

Learning & Teaching Committee

Teaching & Learning Methods Unit

External Examiners

Special Circs Reports & Student Disciplinary Committee

Academic Departments

SSLC

Academic & Support Staff
Cycle of Reflection – Module Leaders

Module MAF
Defines why, what & how we teach

To change or not to change

NO

Module Delivery

YES

Annual Module Review

Feedback from Students

Analysis of Marks

Peer Observation

To change or not to change

YES

Module Delivery
**Cycle of Reflection – Course Leader**

- **To change or not to change**
  - YES
  - **Course Approval Form**
    - Defines the combination of modules
  - NO
  - **All Modules Delivered**

- **Annual Course Review**
  - **Feedback from Students**
  - **Analysis of Marks & Employment Data**
  - **Staff & External Examiners Comments**
SECTION J: PNG-UNRE RULES GOVERNING THE CONDUCT OF STUDENTS

Introduction

Becoming a student at PNG-UNRE is an achievement of which you should all be proud. As you join the staff and students who live and work together on the Vudal campus, we expect that you will treat other members of this community with the dignity and respect that you would wish to receive yourself. To ensure that the University is a harmonious place, we must all accept responsibility for our own actions and endeavour to live by the code of behaviour described here.

It is important that none of us do anything that would damage the good reputation of our University. We should all be proud of ourselves and of the University of which we are a part. Together the staff and students of PNG-UNRE form a partnership that is committed to making our University the best Higher Educational Institution in PNG. All members of staff have a part to play in assisting in the maintenance of student discipline and most cases of minor misconduct will normally be dealt in the first instance by an individual member of staff on an informal basis by counselling in the correct behaviour and conduct.

The University has created the rules described here in conjunction with the Student Representative Council. These rules form the basis of our own judicial system, so that if necessary we are able to reprimand those who behave anti-socially, in a way that is consistently applied, proportionate and fair.

These rules apply to anti-social behaviour such as: verbal and physical abuse, excessive noise pollution, public nuisance, vandalism, and inconsiderate or disrespectful behaviour towards others.

Criminal activities that break the Law, such as: stealing, assault, provocation, group fights or riot, rape, wilful damage of state or personal property, and/or inflicting injury on others and illicit drug use WILL all be referred to the Police and dealt with under the Laws of PNG.

It is important that we recognise that the University is a part of a wider local community of residents. Thus, where appropriate Local Community Leaders and Local Courts may be involved to mediate offences arising between students and the local community.

Offences

Anti-social behaviour and language

Students must not behave in a violent, indecent, disorderly or threatening manner or engage in oral or written abuse towards other students, staff or other individuals. This includes communication via e-mail and social media.

Cheating and Plagiarism

Cheating during examinations is not allowed. Students are not permitted to bring any material into the examination room, other than writing equipment and calculators. No bags or mobile phones can be taken into the examination room. Speaking to other students in the examination room is forbidden. Copying from another student is not allowed. Plagiarism is a form of cheating. It occurs when you copy or reproduce someone else’s words or ideas and then present them as your own without proper acknowledgement. Reproducing large blocks of text and passing it of as your own is referred to as unfair practice. Compiling individual sentences from different sources is bad practice and should be avoided. All assignments must be the students own work and it is forbidden to submit work which has previously been submitted by another student. Module leaders may provide additional rules pertinent to their own coursework.

Criminal behaviour

Students must not engage in any criminal activity against any other student, and must not perform any act which might render the University liable in criminal law. Students must not bring the University into disrepute.
or incur any liability on behalf of the University.

**Driving**
Students must have a valid PNG Driver’s License or a valid Learner’s Permit (in which case they must be accompanied by a Licensed Driver) and must observe Traffic Rules when driving on campus. Students must not drive any vehicle belonging to the University.

**Drugs and alcohol**
The University operates a zero tolerance policy on alcohol and illicit drugs. Students must not, while on the property of the University, or while engaged in any University activity, have in their possession any illegal substances or alcohol. It is also forbidden for students to arrive on campus under the influence of drugs or alcohol.

**Illegal entry into an area or property**
Students must not enter prohibited areas on campus. These areas include staff residential areas, and residences of the opposite gender.

**Intimidation and threats**
Students must not engage in intimidation, threats, blackmail, extortion, fraud, deceit, deception or dishonesty in relation to the University, its staff or students.

**Littering**
Littering including spitting of betel nut is forbidden.

**Nuisance and disturbance**
Students must not disrupt the academic, administrative or social activities of any member of the University including other students. Students must maintain a peaceful and harmonious environment for all at all times.

**Pets/Animals**
Students are not allowed to keep pets/animals on campus. Feeding stray dogs is not encouraged.

**Pornographic materials**
Students must not use University facilities for the production, downloading, or transmission of pornographic materials.

**Sexual harassment and discrimination**
Sexual harassment and discrimination are not allowed in the University.

**Staff/student relationships**
Intimate or sexual relationships between staff and students are forbidden.

**Vandalism and theft**
Students must not damage, deface or misappropriate any property of the University, or any other member of the academic community (including other students) or employee of the University.

**Visitors**
Visitors can only be accommodated once approval has been given by the Director of Student Support Services or the Warden of Students.

**Weapons**
The University operates a zero tolerance policy on weapons. The use of any form of weapon to damage property or cause harm to another person is a criminal offence. In addition it is against the law of the University to use a weapon to threaten another person. Any student seen in possession of any weapon in the vicinity of a conflict will be deemed to be committing an offence. Self-defence will not be accepted as an excuse.

**Dining Hall**
Any offences will be dealt with immediately by the mess supervisor who will then report them to the Director of Student Services for appropriate referral.

The University aims to provide a clean and pleasant atmosphere for resident students to eat and meet socially. Students are reminded of their role in maintaining this atmosphere.

(i) Students are forbidden from entering the mess other than at mealtimes.

(ii) Meals will only be served to residential students and those who have paid an approved casual meal charge. Students must produce their ID cards at the Mess entrance.

(iii) Students who attempt to obtain a meal by deception will be referred to the Director of Student Support Services.

(iv) In the interest of hygiene, students are not allowed to enter the Dining Hall unless they are clean and properly dressed. Students must wash and change before coming to the Dining Hall from sporting activities or from the farm/manual labour.
(v) Any student who has a complaint should make this known to the Mess Supervisor. If dissatisfaction continues the student may make a formal report to the Director of Student Support Services.
(vi) The rules of the University apply to the Dining Hall. Students are expected to show courtesy and politeness to each other and to the mess staff. Any form of disrespect, abuse, aggression, threat or violence will be reported to the Director of Student Support Services for appropriate referral and action.
(vii) Students with special obligations can make prior arrangements to collect late meals. Meals must be collected within one hour of the designated meal time. Where cut meals are required for field visits, a letter is required from the appropriate HOD stating the student name, ID number, meal(s) to be missed and reason for the request.

**Library**

(i) All staff and registered students of PNG UNRE are members of the library.
(ii) External users may register to use the library by paying a membership fee.
(iii) Children aged 8 years and younger are not allowed to enter the Library without a parent or guardian.
(iv) Academic staff may borrow up to 14 books at a time (4 books on normal loan and 10 books on semester loan). Students and non-academic staff may borrow 4 books at a time. Dependents and spouses may only borrow one book at a time. External users are not allowed to borrow books.
(v) Books are due back 4 weeks after the date of borrowing, with the exception of academic staff semester loans which are due back at the end of the semester.
(vi) A fine of 0.20t per day per book is charged for all overdue books up to a maximum of K2.00 for students and K5.00 for staff and their dependents.
(vii) Failure to pay fines will result in withdrawal of borrowing privileges for the duration of that semester or until fines are paid in full.
(viii) The library should only be used for quiet study and research. Any user creating a disturbance will be asked to leave.

(ix) Staff and students should not use the library while suffering from an infectious illness
(x) Borrowers are responsible for taking good care of books while in use in the library or on loan. The borrower will pay for any book lost or damaged. Failure by students to pay for the loss or damage will result in action by the Student Disciplinary Committee, and Diploma or Degree certificates will be withheld until payment has been made. Staff members will be dealt with by their Head of Department. External users found damaging books in the library will be referred to the police and their membership will be cancelled.
(xi) Books in the Reserve Collection, reference books, newspapers and journals are for use in the library only. Their removal will be considered theft and treated accordingly.
(xii) Food, drink, smoking and chewing betel nut are not allowed in the library.
(xiii) Bags, baskets and bilums big enough to conceal books should be left at the entrance.
(xiv) All folders and books (private books and borrowed library books) should be surrendered to duty staff for checking as you leave the library.
(xv) Students must wash and change following field work before being allowed in the library.
(xvi) Mobile phones must be switched off and other electronic gadgets capable of producing noise should not be used in the library.

**Computer laboratory**

(i) Registered students will be allowed to use the computer laboratory during the academic year only.
(ii) Student use takes priority over staff use.
(iii) The computer laboratory must be booked prior to use by classes.
(iv) External customers may pay to book the laboratory during study break. Bookings must be made a month in advance.
(v) Other than authorised bookings, only staff and registered students of the University are allowed in the computer laboratories.
(vi) Animals must not be brought into the laboratory.
(vii) Food, drink, smoking and chewing betel nut are not allowed in the laboratory.
(viii) Headphones or computer speakers must not be connected to the computers in the laboratory, and users must not make distracting noises.
(ix) Mobile phones must be switched off while working in the computer laboratory.
(x) Computer games must not be played in the laboratory.
(xii) Removal of any items from the computer laboratory will be treated as theft and dealt with accordingly.
(xiii) Students found vandalizing any item in the computer laboratory will be referred for disciplinary action.
(xiv) Any technical fault with computers in the laboratory is to be referred to the laboratory technician and only the I.T. staff are authorised to install any software.
(xv) Any printing must be carried out by the help desk assistant.

**Laboratory work & Field work**
No person shall smoke, eat, drink or chew in classrooms, the science laboratories, the computer lab and other areas where computer terminals are installed at any time. Students are expected to comply with safety rules for both the laboratory and farm workshop areas and must wear safety goggles and other safety equipment as requested by the lecturers, instructors and demonstrators for the practical class.
Students are also expected to wear safety gloves and masks when handling dangerous chemicals including pesticides and must dispose of toxic wastes in appropriate containers so as not to pollute the soil or waterways.

**Transport**
Transport is provided to take students on field visits, and it is important to obey traffic laws for your own safety, and the safety of others.

Passengers must not stand or sit on the sides of an open back vehicle, or have any part of their body hanging out when the vehicle is moving. Smoking or chewing betel nut is not allowed in a university vehicle.

**Rules of residence.**
(i) All rules of the University apply to the halls of residence.
(ii) Damage to University property in a Student Hall of residence must be reported to the Warden of that Hall. A student is responsible for paying for any damage or loss of any University property.
(iii) Quietness must be observed in Halls of Residence at all times after 7:00 pm.
(iv) No one of the opposite gender is allowed in Halls of Residence.
(v) Any student who wishes to spend a night away from their Hall of Residence must notify one of the Wardens
(vi) Dependants of students are not permitted to live in the Halls of Residence.
(vii) Students are not allowed to move room without authorization from the Warden of Students and Dorm Warden.
(viii) Students are responsible for the maintenance of their room, and must pay a bond of K115.00 at the beginning of each year.
(ix) Any student who wishes to spend a night away from their Hall of Residence must notify one of the Wardens
(x) No pets/animals are allowed in the Halls of Residence.
(xi) Students are responsible for making the necessary clearances to the Warden before leaving. Students will be charged for replacement of non-returned items.
(xii) Unless authorized, no student shall take to his or her room any item of University property, including dining hall utensils, laboratory equipment, etc.
(xiii) No student is permitted to cook in Halls of Residence except in the Common Rooms. This prohibition does not extend to the use of electric jugs.
Disciplinary procedures.

(i) Offences should be reported to either the Shift Security Supervisor on duty, or Student Support Services. These sections will submit a detailed report to the Registrar who will then assign one of the following two authorities to deal with the case:

• University Student Disciplinary Committee,
• Local Level Government personnel with University staff (security and administration) involvement.

(ii) All cases must be dealt with within two weeks. If a student fails to attend a hearing without providing a satisfactory reason, an appropriately considered penalty will be imposed regardless.

(iii) The Vice Chancellor has authority to intervene at any time in any student’s case.

(iv) Sponsors will be notified of any breach of the Student Rules by a student.

(v) Any person may refer any alleged offence to the Police and nothing in these Rules shall prevent him/her from doing so as a private citizen.

(vi) Any criminal cases will be referred to the police, and the Vice Chancellor or his nominee will consider immediate removal from the University campus.

(vii) Results of disciplinary cases will be published, without names, in the University News bulletin and on Notice Boards.

(viii) In cases of civil disturbance, group fighting, and incidents involving breaches of the peace, the Police will only be called onto campus at the discretion and on the invitation of the Vice Chancellor or under delegated responsibility to the Registrar or their Nominee.

Penalties

The Student Disciplinary Committee will decide a penalty based on the guidelines below. Payments of financial penalties should be made to the Accounts Section.

(i) For minor offences the student may be counselled in the first instance and asked to sign a Good Behaviour Bond.

(ii) A student may be charged a fine of K100 per offence. If multiple offences have been committed, then multiple K100 fines will be charged. In addition, where damage is inflicted on property a student will be expected to cover the associated cost.

(iii) Fines not paid within one calendar month will be increased by K50 every month the fine is not paid.

(iv) A student may be suspended from studies for a semester or excluded from the University at the discretion of the Vice Chancellor.

(v) Offences involving weapons or alcohol will result in immediate suspension for one semester.

(vi) No student will be permitted to re-enrol or graduate until outstanding financial penalties imposed under these Rules have been paid in full.

(vii) Students wishing to re-enrol following suspension must provide two current references from their pastor, or an independent counsellor confirming their rehabilitation.
SECTION K: INFORMATION FOR STAFF – QUALITY ASSURANCE DOCUMENTATION

UNRE Teaching Quality Assurance Systems

PNG-UNRE is committed to producing high quality graduates with the skills and knowledge required to help lead our agricultural, fisheries, forestry and tourism industries. To do this we require stringent Quality Assurance Systems which regulate our teaching provision. These systems are set out in this document. The associated forms required by these systems are found in the Appendix of this document and are indicated in **bold** in the text below.

Course Development and Validation

All UNRE degree, diploma and taught post-graduate courses are internally validated through a five stage process.

**Stage 1.** The idea is discussed in principle at our Learning and Teaching Committee and if given approval this should be recorded in the minutes.

**Stage 2.** The Head of Department completes a Proposed New or Restructured Course Form (PNRCF) which makes the case for the new course. The PNRCF describes the course learning outcomes, the course structure, and maps how these will be delivered over the individual modules. (It is important that the course learning outcomes are cross referenced to the PNG-NQF). Any specific rules and regulations pertaining to this course are explained and justified here. The Form also documents, the resources required for the course to function (human, building, library, IT resources etc.) and comments on their availability. The form must be submitted along with ALL associated Module Approval Forms (MAF) even when these modules are already approved. The module learning outcomes must be mapped to ensure they deliver all the course learning outcomes.

**Stage 3.** The completed PNRCF and associated MAFs are sent to three independent external partners for their feedback. These are: a representative of local or national government, a relevant industry partner and an academic from another institution. The job of these reviewers is to ensure the proposed course is relevant to the needs of PNG and at the required standard. They complete their reviews on Partner Comments on New Course Forms (PCNCF) which are returned to UNRE.

**Stage 4.** The Pro-Vice Chancellor Academic chairs a Course Validation Panel which reviews all of the above forms and determines and documents whether all the criteria have been satisfied. This meeting is documented using the Course Approval Panel Report (CAPR). It records whether UNRE is satisfied there is a need and demand for this course. Is the course appropriate in structure, content and level? Are the QA process in place to ensure the course can be effectively run? Do we have all the resources required to run the course. If these conditions are not satisfied – what alternative outcomes are recommended?

**Stage 5 (External to UNRE).** DHERST accreditation.

The Annual Review of Teaching Process

All UNRE taught courses must be reviewed annually. This process must be documented on a Course Annual Review Form (CARF). It is a requirement of this process that the Head of Department must consider all the comments made by an External Examiner from another University via our External Examiners Report Form (EERF). The individual student voice is captured from each year of the course via the Course Feedback Form (CFF) and the Head of Department is also required to consider the points made by each cohort.

The course annual review process requires that the Head of Department considers...
student academic performance and retention rates over the last five years. Student satisfaction levels must also be monitored and commented upon. The Head of Department is required to comment on all significant feedback and identify targets to address any point made.

The EERF is laid out in a dialogue format and the University is required to return the completed forms to its External Examiner promptly. The Pro-Vice Chancellor Academic is responsible for overseeing all such forms, identifying and addressing any common themes directly to our External Examiners.

To close the loop on student concerns, the completed CARF must be on the agenda of the Student Representative Council meeting.

All individual modules taught within UNRE must also be reviewed by the module leader on an annual basis and the process documented on a Module Annual Review Form (MARF). The individual student voice at the level of the module is captured anonymously via Module Feedback Forms (MFF) and then collectively via the departmental Staff Student Liaison Committee. (SSLC).

MARFs must also review student performance and satisfaction levels. Any issues of concern must be addressed by module leaders’ targets for the next academic year.

To close the loop on student concerns, at the module level the completed MARFs must be on the agenda for the departmental SSLC and discussed at a Learning and Teaching Committee.

Checking Coursework Briefs and Exams

To ensure that coursework briefs and exam papers, assess the appropriate module learning outcomes, are at the appropriate level and are free from mistakes, they must be checked by the module moderator. This process is documented using Draft Exam Form (DEF).

Mark Moderation

To ensure that coursework and exams scripts have been marked fairly with reference to UNRE Marking Criteria (MC), the marks awarded are at the appropriate level, and feedback to the students is clear and constructive, they must be checked by the module moderator. This process is documented using Marking Moderation Form (MMF). Samples of coursework and exam scripts (across the mark range) must be filed for later independent checking. The Marking Criteria (MC) are available to students as part of every Module Coursework Brief (MCB).

Peer Observation and Staff Development

Teaching quality and staff development are ensured by a process of peer observation of teaching documented via our Peer Observation of Teaching Form (POTF) and mentoring of new academic staff and in-house teaching focused seminars.

Within UNRE all our staff agree to realistic annual targets being set to ensure that we achieve the strategic aims of the University. These are agreed and recorded using the Target Setting and Appraisal Form (TSAF).

Schematic of the UNRE cycle of Teaching QA reflective practice, which occurs through the Learning and Teaching Committee.