UNIVERSITI MALAYSIA TERENGGANU

UMT

POSTGRADUATE COURSEWORK PROGRAMME GUIDEBOOK

MASTER OF SCIENCE IN AQUACULTURE & MASTER OF SCIENCE IN TROPICAL FISHERIES

WELCOME TO OUR FACULTY   2024 / 2025

POSTGRADUATE COURSEWORK PROGRAMME GUIDEBOOK
MASTER OF SCIENCE IN AQUACULTURE
MASTER OF SCIENCE IN TROPICAL FISHERIES

SESSION 2024/2025
FACULTY OF FISHERIES AND FOOD SCIENCE
Universiti Malaysia Terengganu

Faculty of Fisheries and Food Science
Universiti Malaysia Terengganu
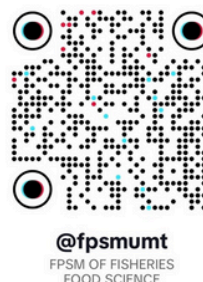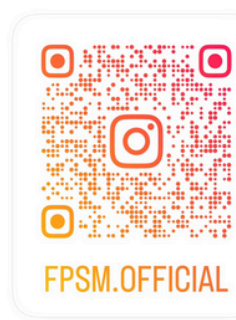21030 Kuala Nerus

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FPSM OF FISHERIES
FOOD SCIENCE

UMT'S PHILOSOPHY

The integration of knowledge and practice based on the faith in Allah is fundamental to the university's endeavour in preparing competent human capital for global prosperity

VISION

A marine-focused university, reputed nationally and respected globally

MISSION

Generating knowledge for the prosperity of the community and world sustainability

SLOGAN

Ocean of Discoveries, for Global Sustainability

NICHE AREA

Marine Science and Aquatic Resources

For further inquiries please contact:

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ACADEMIC CALENDAR
MASTER OF SCIENCE IN AQUACULTURE & MASTER OF SCIENCE IN TROPICAL FISHERIES POSTGRADUATE COURSEWORK PROGRAMME SESSION 2024/2025

SEMESTER I 2024/2025			
ACTIVITIES	**DATE**		**DURATION**
Registration	September 29, 2024	November 2, 2024	5 Weeks
Deferment of Study	September 29, 2024	November 2, 2024	5 Weeks
Lectures	October 6, 2024	November 23, 2024	7 Weeks
Mid-Term Break	November 24, 2024	November 30, 2024	1 week
Lectures	December 1, 2024	January 18, 2025	7 Weeks
Study Week	January 19, 2025	January 25, 2025	1 Week
Examination	January 26, 2025	February 8, 2025	2 Weeks
Semester Break	February 9, 2025	March 8, 2025	4 Weeks

SEMESTER II 2024/2025			
ACTIVITIES	**DATE**		**DURATION**
Registration	March 9, 2025	April 12, 2025	5 Week
Deferment of Study	March 9, 2025	April 12, 2025	5 Weeks
Lectures	March 16, 2025	May 3, 2025	7 Weeks
Mid-Term Break	May 4, 2025	May 10, 2025	1 Week
Lectures	May 11, 2025	June 28, 2025	7 Weeks
Study Week	June 29, 2025	July 5, 2025	1 Week
Examination	July 6, 2025	July 19, 2025	2 Weeks

REMINDER: A student may apply for deferment of study not later than one (1) month of every semester.

SHORT SEMESTER, 2024/2025			
ACTIVITIES	**DATE**		**DURATION**
Registration	July 20, 2025	July 26, 2025	1 Week
Lectures	July 27, 2025	September 20, 2025	8 Weeks
Examination	September 21, 2025	September 27, 2025	1 Week

Table of contents

Handbook

Dean's Message

Assalamualaikum dan Salam Sejahtera
Alhamdullilah,

It is my pleasure to welcome you to the Faculty of Fisheries and Food Science, and well done for choosing this programme to enhance your knowledge and skills. Our school is a great and suitable place for you as we have a strong reputation in discovery, innovation and research excellence in the field of aquatic resources. Through our established academic programmes, we provide a strong foundation for our students to be equipped with expertise that can be beneficial to our communities and environments.

Prof. Ts. Dr. Mohd Effendy Abd. Wahid
Dean
Faculty of Fisheries and Food Science, Universiti Malaysia Terengganu

Currently, the Faculty of Fisheries and Food Science is the only faculty at Universiti Malaysia Terengganu that offers academic programmes at all levels, namely Diploma, Bachelor, Master and PhD. At Master's level, we offer students both methods of study in coursework and full-research.

The Master of Science in Aquaculture programme started in 2005 with the objective to support the development of the aquaculture industry by producing qualified human resources with excellent knowledge, skills, professionalism and ethics. We are proud to be the only university in Malaysia which offers this programme, contributing to the development of research and innovation towards sustainable aquaculture in Asia Pacific region.

Subsequently, the Master of Science in Tropical Fisheries is a unique programme that focuses on the issues and management related to fisheries in tropical region. This is the first university have a programme of its kind in Malaysia. Another distinctive value of this programme is its involvement with our partner universities abroad. By joining this programme, students have the opportunities to study in Kagoshima University (Japan), Nha Trang University (Vietnam), Institut Pertanian Bogor University (Indonesia), National Chiayi University (Taiwan), Sam Ratulangi University (Indonesia), Kasetsart University (Thailand) and University of the Philippines Visayas (Philippines).

Finally, congratulation for being selected to join this programme and I wish you all the best throughout your stay at UMT.

FPSM's Background

Introduction

The establishment of the Faculty of Fisheries and Food Science (FPSM) began on 1 August 2019. This is a continuation of the alignment process of Universiti Malaysia Terengganu. Its history begins with the merger of two study centers namely the School of Food Science and Technology and the School of Fisheries and Aquaculture Science.

Programmes offered

This faculty includes diverse disciplines, combining the fields of science, technology, management and entrepreneurship that will produce globally competitive graduates. The Faculty of Fisheries and Food Science offers study programs at Diploma, Bachelor, Master of Science (Coursework), Master of Science (Research Structure) and Doctor of Philosophy (Research Structure) levels.

The programmes are as follows:

1. Undergraduate Programmes
   a. Diploma in Fisheries
   b. Bachelor of Food Science (Food Service and Nutrition) With Honours
   c. Bachelor of Food Science (Food Technology) With Honours
   d. Bachelor of Science in Agrotechnology (Crop Science) With Honours
   e. Bachelor of Science in Aquaculture with Honours
   f. Bachelor of Applied Science (Fisheries) With Honours
2. Postgraduate Programmes
   a. By Coursework
      i. Master of Science in Aquaculture
      ii. Master of Science in Tropical Fisheries
   b. By Research
      i. Master of Science
      ii. Doctor of Philosophy

FPSM's Background

Offering programs in fisheries, agrotechnology and food science is a pragmatic step towards meeting the workforce demand. This faculty aims to develop trained human resources in the field of fisheries, agrotechnology and food science, able to compete, self-identity and noble character to meet the needs of the workforce. FPSM will play its role from the aspect of mastering various knowledge and skills in the field of fisheries, agrotechnology and food science through the latest approaches, methods and findings in line with government policy and the aspirations of the people.

The Faculty of Fisheries and Food Science (FPSM) is located on Universiti Malaysia Terengganu, in Mengabang Telipot, 18 km from Kuala Terengganu and 8 km from Sultan Mahmud Airport.

Objectives

1. Offering quality study programs to meet current and future needs in fisheries, agrotechnology and food science.
2. Produce graduates who are responsible, knowledgeable, confident and skilled.
3. Exploring all knowledge in all related fields through fundamental and exploratory research.
4. Providing the latest facilities and facilities to support the development of knowledge, learning and scholarship.
5. Develop expertise in the field of food production science and technology under one organization by
6. Providing good opportunities towards the integration and strengthening of knowledge and networking.
7. Bringing together professionals who are knowledgeable and highly skilled in their fields, are leaders and have pure values
8. Provide advice and ideas to interested groups such as breeders, farmers, industry and society as a whole.

1.0 Administration of Faculty of Fisheries And Food Science

DEAN
PROF. Ts. DR. MOHD. EFFENDY ABD. WAHID, FASc., FAPM
DAHP, DVM, Ph.D(Veterinary Medicine), UPM

DEPUTY DEAN (ACADEMIC AND STUDENT AFFAIRS)
PROF. MADYA DR. RUMEAIDA MAT PIAH
B.Sc. (KUSTEM), Ph.D (Fish Population Dynamics), SCU

DEPUTY DEAN (TALENT AND RESEARCH)
PROF. MADYA DR. HAYATI MOHD YUSOF
B.Sc. (Hons.), M.Sc. (UKM), Ph.D. (Univ. of Southampton)

HEAD OF DIPLOMA IN FISHERIES
DR. TUN NURUL AIMI BINTI MAT JAAFAR
B.Sc (UMT), Ph.D (Molecular Ecology), Bangor

HEAD OF BACHELOR OF APPLIED SCIENCES (FISHERIES) WITH
HONOURS
PROF. MADYA DR. SEAH YING GIAT
B.Sc (Hons), M.Sc, Ph.D (Fish Taxanomy), UKM

HEAD OF BACHELOR OF SCIENCE IN AGROTECHNOLOGY
(AQUACULTURE) WITH HONOURS
DR. NOORDIYANA BINTI MAT NOORDIN
B.Sc (KUSTEM), Ph.D (Aquaculture Nutrition), James Cook

1.0 Administration of Faculty of Fisheries And Food Science

HEAD OF BACHELOR OF SCIENCE AGROTECHNOLOGY (CROP SCIENCE) WITH HONOURS
DR. SUHAIZAN BINTI LOB
B.Sc Applied Biology (Environmental Biology) (USM), M.Sc. (USM), Ph.D. (Lincoln University, New Zealand

HEAD OF BACHELOR OF FOOD SCIENCE (FOOD TECHNOLOGY) WITH HONOURS
Ts. DR. FISAL BIN HAJI AHMAD
B.Sc. Food Science & Technology (UPM), M.Sc. (USM), Ph.D. (UMS)

HEAD OF BACHELOR OF FOOD SCIENCE (FOOD SERVICE AND NUTRITION) WITH HONOURS
PROF. MADYA Ts. DR. ZAMZAHAILA BINTI MOHD ZIN
B.Sc. Food Science and Technology (UPM), M.Sc. (UPM), Ph.D. (Univ. of Nottingham, UK)

PROGRAMME CHAIR MASTER OF SCIENCE BY COURSEWORK
DR. SHARIFAH RAHMAH BINTI SYED MUHAMMAD
B.Sc Applied Sciences (Aquatic Biology) (USM), M.Sc (USM), Ph.D (Kinki University, Japan)

DEPUTY REGISTRAR
MR. MOHAMMAD ZAIDI BIN MAHADI

ASSITANT REGISTRAR
MR. MUHAMMAD SYAHRUNIZAN ABDUL RASHID

2.0 Academician of Faculty of Fisheries And Food Science

PROF. Ts. DR. MOHD. EFFENDY BIN ABD. WAHID, FASc., FAPM
DAHP, DVM, Ph.D (Veterinary Medicine), UPM
Area: Veterinary Medicine
Expertise: Immunopathology
Specialization: Animal Immunology, Bacteriology & Vaccination

PROF. DR. NAJIAH BINTI MUSA
D.V.M., Ph.D (Microbiology), UPM
Area: Veterinary Medicine
Expertise: Microbiology
Specialization: Aquatic Animal Health & Bacteriology

PROF. MADYA DR. RUMEAIDA BINTI MAT PIAH
B.Sc. (KUSTEM), Ph.D (Fish Population Dynamics), SCU
Area: Fisheries Science
Expertise: Fisheries Management
Specialization: Fish Population Dynamics

PROF. MADYA DR. MOHD HANAFI BIN IDRIS
B.Sc, M.Sc, Ph.D (Aquatic Biology), UPM
Area: Fisheries Science
Expertise: Aquatic Biology
Specialization: Ecology & Aquatic Fauna (Bivalve)

PROF. MADYA DR. NOR FAZLIYANA BINTI MOHTAR
B.Sc (UMT), Ph.D (Food Chemistry), Auckland a:
Area: Aquaculture
Expertise: Food Chemistry
Specialization: Fishery By-Products

PROF. MADYA DR. SANDRA CATHERINE A/P ZAINATHAN
B.Sc. (Hons.) (KUSTEM), Ph.D (Aquatic Virology), UTAS
Area: Fisheries Science
Expertise: Aquatic Virology
Specialization: Molecular Virology

2.0 Academician of Faculty of Fisheries And Food Science

PROF. MADYA DR. NADIRAH BINTI MUSA
B.Sc, M.Sc. (UKM), Ph.D (Fish Physiology), Stirling
Area: Biology
Expertise: Fish Physiology
Specialization: Aquatic Ecophysiology

PROF. MADYA DR. SEAH YING GIAT
B.Sc (Hons), M.Sc, Ph.D (Fish Taxanomy), UKM
Area: Marine Science
Expertise: Fish Taxonomy
Specialization: Marine Fish Taxonomy

PROF. MADYA Ts. DR. WAN NURUL NADIAH BINTI WAN RASDI
B.Sc, M.Sc (UMT), Ph.D (Livefeed Culture), Flinders
Area: Marine Biology
Expertise: Aquaculture Nutrition
Specialization: Live Feed Culture & Planktonology

PROF. MADYA ChM. DR. MOHD ZUL HELMI BIN ROZAINI
B.Sc., (Kimia), Ph.D (Bioteknologi), UMT
Area: Postharvest Fisheries
Expertise: Biotechnology
Specialization: Biomaterials

PROF. MADYA DR. ABU HENA MUSTAFA KAMAL
B. Sc (Hons), M.Sc (CU), M.S. (UPM)
Area: Ecology & Aquaculture
Expertise: Ecology
Specialization: Fisheries Ecology, Aquaculture Production, Seaweed & Mangrove Ecology

DR. SHAHREZA BIN MD SHERIFF
B.Sc., M.Sc. (UPM), Ph.D (Fish Genetics), UKM
Area: Aquaculture
Expertise: Fish Genetic
Specialization: Fish Genetic Improvement

2.0 Academician of Faculty of Fisheries And Food Science

DR. WAN MOHD RAUHAN BIN WAN HUSSIN
B.Sc (UPM), M.Sc (UMT), Ph.D (Marine Ecology), St. Andrews
Area: Fisheries Science
Expertise: Marine Ecology
Specialization: Benthic Ecology

DR. NUR ASMA BINTI ARIFFIN
B.Sc., M.Sc. (UPM), Ph.D (Fish Genetics), UKM
Area: Fisheries Science
Expertise: Fish Genetic
Specialization: Fish Genomics

DR. SHARIFAH RAHMAH BINTI SYED MUHAMMAD
B.Sc, M.Sc (USM), Ph.D (Aquatic Biology), Kinki
Area: Aquatic Biology
Expertise: Aquaculture
Specialization: Aquaculture Nutrition

Ts. DR. NIK AZIZ BIN NIK ALI
B.Sc, M.Sc, Ph.D (Energy Technology), UMT
Area: Physics
Expertise: Energy Technology
Specialization: Renewable Technology (Aquatic Resources)

DR. SHARIFAH NOOR EMILIA BINTI SY JAMIL FAD`AAK
B.Sc (UMS), M.Sc, Ph.D (Aquatic Microbiology), Kinki
Area: Aquaculture
Expertise: Microbiology
Specialization: Aquatic Microbial Ecology

DR. TUN NURUL AIMI BINTI MAT JAAFAR
B.Sc (UMT), Ph.D (Molecular Ecology), Bangor
Area: Aquaculture
Expertise: Molecular Ecology
Specialization: Population Genetic Structure

2.0 Academician of Faculty of Fisheries And Food Science

DR. EMIENOUR MUZALINA BINTI MUSTAFA
B.Sc, M. Tech, Ph.D (Genetic in Ecotoxilogy), UM
Area: Biochemistry
Expertise: Algae Genetic Ecotoxicology
Specialization: Algae Genetic Ecotoxicology & Agro Waste Bioremediation

DR. EZMAHAMRUL AFREEN BIN AWALLUDIN
B.Sc (KUSTEM), M.Sc, Ph.D (Computer Science), UMT
Area: Computer Science
Expertise: Image Recognition
Specialization: Image Processing

DR. NOORDIYANA BINTI MAT NOORDIN
B.Sc (KUSTEM), Ph.D (Aquaculture Nutrition), James Cook
Area: Aquaculture
Expertise: Aquaculture Nutrition
Specialization: Nutritional Physiology

DR. SHUMPEI IEHATA
B.Sc, M.Sc, Ph.D (Environmental Microbiology), Mie
Area: Biology
Expertise: Microbiology
Specialization: Aquatic Microbiology

DR. MOHD FAZRUL HISAM BIN ABD AZIZ
B.Sc (UMT), M.Sc (UTM), Ph.D (Fisheries Technology), PSU
Area: Fisheries Science
Expertise: Fisheries Technology
Specialization: Ecology and Fishing Gear Technology

Ts. DR. LOKMAN NOR HAKIM BIN NORAZMI
B.Sc (KUSTEM), M.Sc (UMT), Ph.D (Fish Breeding Technology), UTAS
Area: Aquaculture
Expertise: Fish Breeding Technology
Specialization: Reproductive Physiology and Endocrinology

2.0 Academician of Faculty of Fisheries And Food Science

DR. RASINA BINTI ABDUL RASID@AWANG
B.Sc (KUSTEM), Ph.D (Feed Formulation), Stirling
Area: Aquaculture
Expertise: Aquaculture Nutrition
Specialization: Feed Formulation & Crustacean Nutrition

DR. SITI ARIZA BINTI ARIPIN
B.Sc, M.Sc (UMT), Ph.D (Physiology), KU
Area: Marine Biology
Expertise: Physiology
Specialization: Fish Reproductive Physiology

DR. ROSLIZAWATI BINTI AB.LAH
B.Sc (KUSTEM), M.Sc (Bergen), Ph.D (Mollusc Biology), SCU
Area: Fisheries Science
Expertise: Molluscan Biology
Specialization: Molluscan Physiology & Behaviour

DR. NURUL AQILAH BINTI IBERAHIM
B. Sc (UMS), M. Sc (UMT), Ph. D (Mikrobiologi dan Bioteknologi),
Aberdeen Area: Aquaculture
Expertise: Aquatic Microbiology
Specialization: Aquatic Mycology

DR. MUHAMMAD ABDUH BIN YAZED
B. Sc (Hons), M. Sc, Ph.D (Broodstock Nutrition), UMT
Area: Aquaculture
Expertise: Fish Breeding Technique
Specialization: Broodstock and Hatchery Management

DR. AHASAN HABIB
B. Sc (Hons), M. Sc (Bangladesh), M. Sc (Norway). Ph.D (Brunei
Darussalam)
Area: Fisheries Science
Expertise: Population Genetic, Fisheries Economic & Climate Change
Specialization: Population Genetic Structure, Fisheries Phylogeny &
Biogeography

2.0 Academician of Faculty of Fisheries And Food Science

DR. HASSAN IBRAHIM SHEIKH MOHAMED
B. Sc (Hons), M.Sc, Ph.D (IIUM)
Area: Biotechnology
Expertise: Marine Biotechnology & Natural Product
Specialization: Conservation Biology & Natural Products Chemistry

DR. SHAZANA BINTI SHARIR
Diploma (UMT), BSc (UMT), MSC (Bristol), PhD (UKM)
Area: Fisheries
Expertise: Aquatic Ecology
Specialization: Fish Telemetry, Limnology and River Conservation Management

DR. ASLINA BINTI NASIR
B.Sc (UMT), Ph.D (UMT)
Area: Mathematical Sciences
Expertise: Mathematics, Statistics & Research Methodology
Specialization: Statistics & Computational Mathematics (Applied)

DR. ABDULLAH BIN MOHAMAD
B.Sc (Economics - Natural resources), UMT, M.Sc (Economics), Ph.D (Economics), UPM
Area: Economics
Expertise: Agricultural Economics
Specialization: Fishery Economics

DR. YENY NADIRA BINTI KAMARUZZAMAN
B.Sc (UMT), Msc (Bangor), PhD (UKM)
Area: Fisheries
Expertise: Fisheries Oceanography
Specialization: Ecology / Marine Remote Sensing

DR. MIMI IRYANI BINTI MAT TAIB
B.Sc. (UMT), M.Sc. (UMT), Ph.D. (Biotechnology), UMT
Area: Aquaculture
Expertise: Aquaculture Biotechnology
Specialization: Aquaculture Biotechnology

2.0 Academician of Faculty of Fisheries And Food Science

DR. MUHAMAD NAIMULLAH BIN MUHAMMAD IKHWANUDDIN
Diploma (UiTM), BSc (UMT), MSC (UMT), PhD (NTOU)
Area: Fisheries
Expertise: Fishing Gear Technology
Specialization: Fishing Gear Engineering

CIK ZAHAITUN MAHANI BINTI ZAKARIAH
B. Sc, M.Sc (USM)
Area: Biology
Expertise: Policy & Law
Specialization: Aquatic Resources Management

3.0 Academic System

3.1 Semester System

The 2024/2025 academic session at UMT starts from October 6, 2024 to September 27, 2025 for both programmes.

Generally, every academic year consists of three (3) semesters, Semester I, II and short semester where each of them consists of 41 weeks (36 weeks of lectures and 5 weeks of examinations). The duration of the Master of Science in Aquaculture is one academic year, which includes two semesters. In comparison, the Master of Science in Tropical Fisheries spans 1.5 years and covers three semesters.

3.2 Credit Hours

For all courses, an hour lecture in a week will be rated as one credit hour. Practical classes which usually require 3 hours per week in the laboratory or field are also rated as one credit hour. The following are the description of different credit hours.

i. 2 hours of lecture per week (2+0) or
ii. 6 hours of practical per week (0+6) or
iii. 2 hours of lecture + 3 hours of practical per week (2+1) or
iv. 3 hours of lecture per week (3+0)

3.3 Credit hour requirements for graduation

The minimum credit hours required for graduation is 40 (credit hours) for both programmes.

3.4 Curriculum

The curriculum is the core of a learning programme. Student who passes all core courses in the curriculum is allowed to graduate provided they fulfill the required credit hours.

Student who failed any core courses and unable to repeat the course within the study programme, is required to repeat the particular course in the extended semester without taking consideration the minimum credit hours per semester.

3.0 Academic System

3.5 Programme Scheme

The programme scheme is important and has been aligned with the educational goals of the university. Details of the programme scheme for the programme can be referred at the respective pages.

3.6 Course Selection

Each programme has two components:

i. Programme Core Courses

The programme core courses are the courses offered based on the needs of the programme. These courses develop the students' expertise in the field of study. It is compulsory for the students to take this course and they must pass these courses with a minimum grade of C+. Shall they fail, they have to repeat the respective course.

ii. Elective

Elective courses are courses to be chosen by students from the faculty or other faculty based on their interest and their potential. The minimum credit hours for elective courses are depending on the programmes. Elective courses will be graded and their credits will be taken into account.

3.7 Others

i. Fees/Debt

Students who still owe or do not have financial guarantor are not allowed to register.

ii. Information Update

Students are responsible to update their personal information from time to time and inform the faculty for record purposes.

4.0 Master of Science In Aquaculture

4.1 Admission Requirements

- Bachelor's degree in related field with a minimum CGPA of 2.50 or equivalent from UMT or any other higher institution recognized by the Senate; or
- Any other equivalent qualification and posseses evidence of adequate related to the research or work experience recognized by the Senate

Additional requirement for international students;

- Demonstrate competency in English, satisfactory to the requirements of the university

4.2 List of Courses

Core Course (34 credit hours)

Course Code	Course Name	Credit Hours
AQU5014	Research Methodology	4 (4+0)
AQU5024	Biosecurity and Seafood Safety	4 (3+1)
AQU5034	Sustainable Aquaculture	4 (4+0)
AQU5183	Special Topics in Aquaculture	3 (3+0)
AQU5064	Aquaculture Business Management	4 (4+0)
AQU5203	Fish Health Management	3 (2+1)
AQU5213	Advance in Post-Harvest Technology	3 (2+1)
AQU5223	Fish Nutrition	3 (2+1)
AQU5173	Case Study I	3 (3+0)
AQU5193	Case Study II	3 (0+3)

Elective Course (6 credit hours)

Course Code	Course Name	Credit Hours
AQU5233	Advanced Fish Nutrition & Physiology	3 (2+1)
AQU5243	Open Water Aquaculture System	3 (2+1)
AQU5253	Fish Reproductive Physiology	3 (2+1)
AQU5023	Live Feed Technology	3 (2+1)
AQU5063	Advanced Aquaculture Systems Design	3 (2+1)
AQU5263	Advanced Seed Production	3 (3+0)

* Students are required to take at least 6 credit hours of any elective courses offered by this school or any equivalent standard courses offered by other schools.

4.0 Master of Science In Aquaculture

4.3 Programme Scheme

SEMESTER I		
Course Code	**Course Name**	**Credit Hours**
AQU5014	Research Methodology	4 (4+0)
AQU5024	Biosecurity and Seafood Safety	4 (3+1)
AQU5034	Sustainable Aquaculture	4 (4+0)
AQU5173	Case Study I	3 (3+0)
AQU5183	Special Topics in Aquaculture	3 (3+0)
XX XXXX	Elective	3
	Sub Total	**21**

SEMESTER II		
Course Code	**Course Name**	**Credit Hours**
AQU5064	Aquaculture Business Management	4 (4+0)
AQU5193	Case Study II	3 (0+3)
AQU5203	Fish Health Management	3 (2+1)
AQU5213	Advance in Post-Harvest Technology	3 (2+1)
AQU5223	Fish Nutrition	3 (2+1)
XX XXXX	Elective	3
	Sub Total	**19**
	Total	**40**

4.0 Master of Science In Aquaculture

4.4 Course Synopsis

AQU5014 : Research Methodology
Credit Hours : 4 (4+0)

This course aims to introduce students to the conceptualising and conducting a research task. Students will be exposed to research skills particularly of research writing that includes research questions, development of hypothesis and suitability of selected experimental approach and design and creating a research plan. Students will be required to present and submit a research proposal of a selected relevant topic. In addition, students will be introduced to various data and strategies of analysing such as collection of data, statistical tecnhniques and hypothesis testing. Research ethics and academic misconducts will be also taught. At the end of the course, students will be able to acquire skills to develop a good research related to the concerned topic.

AQU5024 : Biosecurity And Seafood Safety
Credit Hours : 4 (3+1)

The aim of this course is to emphasize the importance of biosecurity and seafood safety. It is also aims to provide students to the best management concept that can be used in aquaculture with the development of an environmental friendly and sustainable sector. Topics covered include a food-chain perspective from chemical contaminants in farmed fish and potential impact on human health and also methods of improving fish health, quality and safety, as well as managing such issues. Students will also learn about good aquaculture practices (GAP) in different aspects of best practice which includes local and global nature of aquaculture, roles of stakeholders, compliance issues in the authorization of new projects, and environmental, management and operational specifications that make up best practices around aquaculture.

4.0 Master of Science In Aquaculture

AQU5034 : Sustainable Aquaculture
Credit Hours : 4 (4+0)
The aim of the course is to introduce students to the aquaculture sustainability issues that will include understanding and management of the industry's ecological and socio-economic aspects on a local and global scale. The course will discuss the issue of sustainability in details, including all its components, technological, environmental, social, and economic. This course will also explain the impacts of aquaculture, as well as management practices for mitigation and resilience, to enhance sustainability. At the end of the course, students are expected to have a comprehensive knowledge and understanding on the issues and impacts of aquaculture, factors affecting aquaculture sustainability, and management principles to achieve sustainability of the aquaculture industry.

AQU5183 : Special Topics in Aquaculture
Credit Hours : 3 (3+0)
This course exposes the students to the recent development and issues in aquaculture industries. Lectures on the current aquaculture technologies and issues will be given by prominent lecturers of the related subjects. Students are also required to select, digest and criticize, make a presentation and submit a report on a recently published journal that highlighting the technologies and issues. All the topics will be related to aquaculture but not limited to environmental issues, production technologies, feed and nutrition, health management, socio-economic and policy, engineering and biotechnology.

4.0 Master of Science In Aquaculture

AQU5064 : Aquaculture Business Management
Credit Hours : 4 (4+0)

The aim of this course is to develop knowledge and skills that would enable students plan and run their enterprises based on sound economic principles. This includes understanding of the basic aquaculture business concept, dimension and dynamics, and production and marketing concepts, thus help identify potential business opportunities and economic benefits. The course will also describe the business planning, marketing management, financial management, capital budgeting and risk management, operation and the aquaculture farm management and human resource management. Students will also get idea of incentive schemes and government facilities to start aquaculture business, and policies and regulation for best management practices of aquaculture. At the end of the course, students would be able to develop a critical understanding of economic theories and knowledge that would be helpful to aquaculture business decision making and to develop aquaculture business plan.

AQU5203 : Fish Health Management
Credit Hours : 4 (3+1)

This course exposes concepts for management of aquatic animal health. Students will be exposed to principles of disease diagnosis and proper diagnostic techniques, use of chemicals and antibiotics, disease prevention and control. At the end of the course, students will be able to evaluate the diseases in aquaculture caused by pathogens, environmental factors or nutritional imbalance. Students will be able to choose and decide the correct chemicals and antibiotics for treatment. The importance of biosecurity measures in aquatic animal health management will also be discussed to accommodate different production systems or farm situations.

4.0 Master of Science In Aquaculture

AQU5213 : Advance in Post Harvest Technologiy
Credit Hours : 3 (2+1)
The course provides knowledge on process and/or activities immediately after catch, handling and transportation, processing and distribution of fish and fish products. It covers the aspects of physicochemical and biochemical changes, method of quality assessment and current technological development for product shelf-life extension.

AQU5223 : Fish Nutrition
Credit Hours : 3 (2+1)
The course emphasizes on writing of technical report based on current and real-life aquaculture issues. The report writing process starts with developing a review outline that will provide the foundation of each student to complete their technical report at the end of the semester. Scientific information presented in the proposal will cover the latest knowledge in research, various research techniques and development as well as advanced technology in respected field. Emphasis will also be given on the originality and the ability to critically analyze the literature.

AQU5173 : Case Study I
Credit Hours : 3 (3+0)
The course emphasizes on writing of technical report based on current and real-life aquaculture issues. The report writing process starts with developing a review outline that will provide the foundation of each student to complete their technical report at the end of the semester. Scientific information presented in the proposal will cover the latest knowledge in research, various research techniques and development as well as advanced technology in respected field. Emphasis will also be given on the originality and the ability to critically analyze the literature.

4.0 Master of Science In Aquaculture

AQU5193 : Case Study II
Credit Hours : 3 (0+3)

The course emphasizes on writing of technical report based on current and real-life aquaculture issues. The report writing process starts with developing a review outline that will provide the foundation of each student to complete their technical report at the end of the semester. Scientific information presented in the result output will cover the lates knowledge in research, various research techniques and development as well as advanced technology in respected field. Emphasis will also be given on the originality and the ability to critically analyse the literature.

AQU5233 : Advanced Fish Nutrition And Physiology
Credit Hours : 3 (2+1)

The aim of this course is to provide fundamental knowledge of nutritional biochemistry and feeding physiology in fish. This course focuses on classification, structure, importance and requirement of macro nutrients; protein, lipid and carbohydrate and micro nutrients; vitamins and mineral. It also covers nutritional energetics, including energy production, balance, retention as well as various nutrients catabolism. This course also enables students to study nutrients uptake and utilization from physiological perspective. It includes anatomy and physiology of digestive tract, digestibility, transportation, storage and mobilization of nutrients reserved. In addition, this course emphasizes on analysis of macro and micro nutrients in aquafeed and fish enzymatic response to certain ingredients. At the end of the course the students will be able to explain the differences between nutrients action as well as perform suitable nutrients analysis in-vivo and in-vitro.

4.0 Master of Science In Aquaculture

AQU5243 : Open Water Aquaculture System
Credit Hours : 3 (2+1)

This course aims to expose the students to the system, engineering and technology of open water aquaculture production systems, which include Ocean Ranching, Suspended and Floating (cages, raft, net pan, surface long-line) and Submerged systems. Students will learn the design, management, operation and cost of the system for hatching and nursery, grow-up and stocking purposes. The course also covers the uses of the systems in producing fishes, shellfish, macroalgae and also other crustacean and gastropods. Challenges faced by the system in an open environment and the current issues will also be discussed in detail. In this course, the students will have their hand on the production systems for substantial amount of time. At the end of the course, students will be able to manage and operate open water production facilities for aquaculture purpose.

AQU5253 : Fish Reproductive Physiology
Credit Hours : 3 (2+1)

This course provides understanding on reproductive physiology of male and female reproductive system of vertebrate and invertebrate aquatic organism. The course focuses on the processes involved in the production of gametes and how their development is synchronizes in both sexes to achieve fertilization, the processes involved in sexual differentiation, the reproductive strategies which have been adopted in order to achieve fertilization and spawn at the most suitable times of the year. The roles of the endocrine system and signal transduction processes in controlling reproduction are examined. Topical examples of reproductive adaptations and technologies in fish and shrimp culture are considered such as hormonal manipulation, the development of gene silencing through RNA interference (RNAi) and surrogate broodstock technologies.

4.0 Master of Science In Aquaculture

AQU5023 : Live Feed Technology
Credit Hours : 3 (2+1)

The aim of this course is to develop the different live feed culture technology particularly in larval rearing aspect. Phytoplankton and zooplankton will be cultured for aquatic organisms. In addition, this course emphasizes on the advance culture technology of cysts and resting eggs production of major zooplankton. Different mass production technology for live feed including photobioreactos, tank, and plastic bag will be highlighted. Advance harvesting technology and nutritional profile analysis will be performed. At the end of the course students will be able to culture and mass-produced live feed based on available technology and culture practices.

AQU5063 : Advanced Aquaculture System Design
Credit Hours : 3 (2+1)

This course aims to equip students with advanced theoretical and practical knowledge on how to design the major aquaculture systems and sub-systems so that students have an in-depth understanding of the system design and they can design each system by themselves. Through this course, students will learn how to compute each of the components throughout a design process of major systems - open systems, semi-closed systems, and closed systems. Students will also learn details on how to design supporting systems (sub-systems) such as water supply system, pumping station, aeration (or oxygenation) system, treatment system etc. Students will also be exposed to advanced tools such as computer software in the design process. At the end of the course, students are expected to have knowledge and skills to design aquaculture systems and support systems.

4.0 Master of Science In Aquaculture

AQU5263 : Advanced Seed Production
Credit Hours : 3 (3+0)

The aim of this course is to provide an understanding of fish breeding and its importance in aquaculture. In this course, the student will be exposed to several main topics comprising of introduction to fish breeding, and advanced breeding techniques including monosex production, polyploidy, androgenesis and gynogenesis. It also discusses chromosomal genetics and the concept of selective breeding, sex determination and control in fish production. In this course, students will also be exposed to the concept of SFP and SPR, the application of biotechnology in fish breeding, and the impact of genetic improvement programs on wild stocks and the ecosystem. At the end of the course, students should be able to apply the knowledge of fish breeding in aquaculture seed production.

5.0 Master of Science In Tropical Fisheries

5.1 Admission Requirement
- Bachelor's degree in related field with a minimum CGPA of 2.50 or equivalent from UMT or any other higher institution recognized by the Senate; or
- Any other equivalent qualification and posseses evidence of adequate related to the research or work experience recognized by the Senate

Additional requirement for international students;
- Demonstrate competency in English, satisfactory to the requirements of the university

5.2 List of Courses
Core Courses

Course Code	Course Name	Credit Hours
FIS5012	Advanced Fisheries Microbiology	2 (2+0)
FIS5022	Conservation and Management of Fishery Resources	2 (2+0)
FIS5032	Statistical Techniques in Fishery	2 (2+0)
FIS5072	Survey and Monitoring System	2 (2+0)
FIS5082	Fishing Gears Technology	2 (2+0)
FIS5092	Current Issues in Fisheries	2 (2+0)
FIS5102	Regional Fishery Governance, Law and Policy	2 (2+0)
FIS5112	Sustainable Fisheries and Community Livelihood	2 (2+0)
FIS5983A	Project I	3 (3+0)
FIS5983B	Project II	3 (3+0)
FIS5996	Project III	6 (0+6)

Elective Courses

Course Code	Course Name	Credit Hours
FIS5123	Marine Pollution and Fisheries	3 (2+1)
FIS5133	Fishery Molecular Ecology	3 (3+0)
FIS5143	Fisheries Limnology and Oceanography	3 (3+0)
FIS5153	Sport and Game Fishing	3 (3+0)
FIS5163	Coral Reef Fisheries	3 (3+0)
FIS5173	Fisheries Bioinformatics	3 (3+0)
FIS5183	Habitat Replenishment Areas	3 (3+0)
FIS5193	Fisheries Post-harvest Technology	3 (2+1)
FIS5203	Biosecurity and Seafood Safety	3 (2+1)
FIS5213	Fisheries Biosystems	3 (3+0)
FIS5223	Fisheries Product Innovation	3 (2+1)

* Students are required to take at least 6 credit hours of any elective courses offered by this school or any equivalent standard courses offered by other schools.

5.0 Master of Science In Tropical Fisheries

5.3 Programme Scheme

SEMESTER I		
Course Code	**Course Name**	**Credit Hours**
FIS5012	Advanced Fisheries Microbiology	2 (2+0)
FIS5022	Conservation and Management of Fishery Resources	2 (2+0)
FIS5032	Statistical Techniques in Fishery	2 (2+0)
FIS5983A	Project I	3 (3+0)
XX XXXX	Elective	3
	Sub Total	12

SEMESTER II		
Course Code	**Course Name**	**Credit Hours**
FIS5072	Survey and Monitoring System	2 (2+0)
FIS5082	Fishing Gears Technology	2 (2+0)
FIS5092	Current Issues in Fisheries	2 (2+0)
FIS5983B	Project II	3 (3+0)
XX XXXX	Elective	3
XX XXXX	Elective	3
	Sub Total	15

Course Code	**Course Name**	**Credit Hours**
FIS5102	Regional Fishery Governance, Law and Policy	2 (2+0)
FIS5112	Sustainable Fisheries and Community Livelihood	2 (2+0)
FIS5996	Project III	6 (0+6)
XX XXXX	Elective	3
	Sub Total	13
	Total	40

5.0 Master of Science In Tropical Fisheries

5.4 Course Synopsis

FIS5012 : Advanced Fisheries Microbiology
Credit Hours : 2 (2+0)
The aim of this course is to highlight the important roles of microbes in aquatic ecosystems including the roles in tackling the natural and anthropogenic problems. Topics covered including the advanced concepts of microbiology, review on the freshwater and marine microbial life, the role of aquatic microbes in the ecology and as well as the problems in fisheries including over-exploitation of fish, pollution and climate change. These topics also cover several advanced microbiological techniques such as metagenomics, metatranscriptomics, metaproteomics.

FIS5022 : Conservation and Management of Fishery Resources
Credit Hours : 2 (2+0)
This course introduces to the students on the diversity and techniques of exploitation of fisheries resources. Students will also discuss the current issues related to the local and global management and conservation of fisheries resources. Students also will be exposed to the method of protection of endangered species and sustainable harvesting. At the end of the course, students will be able to explain the fisheries management strategies with emphasis on the integration of various aspects and stakeholders involved in the uncertain environment.

5.0 Master of Science In Tropical Fisheries

FIS5032 : Statistical Techniques in Fishery
Credit Hours : 2 (2+0)

This course introduces the student to the advanced concepts and techniques of several statistical tests. It covers the univariate statistical anlyses including parametric (e.g. t-Test and ANOVA) and non-parametric tests (e.g. Mann-Whitney and Kruskal-Wallis). Students will also be introduced to the correlation and regression analyses to analyse various factors in the data. A multivariate analysis including Bray-Curtis Similarity, Multi-Dimensional Scaling and Principle Component Analysis are some of the advanced analytical techniques in this course. Students will use free-version statistical package like PAST and the university-licensed package - SPSS. After successfully completing this course, a graduate student should be able to construct an appropriate statistical analysis of most experiments which involve biological and physical datasets as well as will be able to interpret the statistical results.

FIS5072 : Survey and Monitoring System
Credit Hours : 2 (2+0)

This course provides an introduction to the current protocols and sampling designs for the fishery monitoring programs and resource surveys. The process includes the coverage levels, selection process, fishery definitions, data collection, analysis and application and other monitoring metrics, as well as communication and data access to vessel owners and other stake holders. The tools such as remote sensing and GIS will be introduced to provide accurate data and information for a better resources management. In addition, several analysis applications for survey and monitoring will also be introduced.

5.0 Master of Science In Tropical Fisheries

FIS5082 : Fishing Gears Technology
Credit Hours : 2 (2+0)

This course offers further experience on the theory, design and application of fishing-related gears. Emphasis is placed on the design and technology of the general gears in capture fisheries as well as the onboard machineries used in operating the gears. This course also introduces the students on the navigation and instruments used in aiding fish finding. This course also emphasizes on the application of gears in relation to the sustainable fishery resources.

FIS5092 : Current Issues in Fisheries
Credit Hours : 2 (2+0)

This course focuses on the various issues related to coastal resource exploitation, uses and human factors. This is expanded to issues related to socio-economic and governance aspects. Regional and global issues on coastal and large marine ecosystem exploitation will be discussed. This course will encourage students to develop personal skills through discussion on given topics in regional and global fisheries issues.

FIS5102 : Regional Fishery Governance, Law and Policy
Credit Hours : 2 (2+0)

This course gives an introduction to a systematic concept relating to the exercise of economic, political and administrative authority in fisheries. This course discusses the fishery governance on three levels, regional, national and local dimensions, with the emphasis on the local level. It includes legally binding rules, such as national policies (Fisheriy Act 1985) and legislation or international treaties as well as customary social arrangement. The main content of this course focuses on the current law, policy and regulatory frameworks that connect the government with society and socio-ecological systems

5.0 Master of Science In Tropical Fisheries

FIS5112 : Sustainable Fisheries and Community Livelihood
Credit Hours : 2 (2+0)

This course provides an introduction to the application of the sustainable development concepts in the fishing practices for the benefit of communities who depend on the fisheries-based livelihoods. The main theoretical concepts covered in the course, i.e the sustainable development and community development frameworks as well as the anthropology of fishing and the livelihood approach, provide basis for the practical discussions on global and local sustainable fishing practices and their supporting frameworks such as community-based fisheries management and both mainstream and local codes of practice in fisheries

FIS5983A : Project I
Credit Hours : 3 (3+0)

This course aims to introduce students to the task of planning scientific experiments. Students will be exposed to research skills particularly of proposal writing that includes research questions, development of hypothesis and suitability of selected experimental design and creating a research plan. Students will be required to present and submit a research proposal of a selected relevant topic. In addition, students will also be introduced to research ethics and academic misconducts. At the end of the course, students will be able to develop and acquire skills to write a good research proposal.

5.0 Master of Science In Tropical Fisheries

FIS5983B : Project II
Credit Hours : 3 (3+0)
This course aims to provide guidance in the final completion of the research paper/graduate project and to prepare students for viva voce. It focuses on research progress and finalising data. Students will be exposed to various data and strategies of analysing and interpretating the data. Students will be required to present and report the research progress and outcomes. At the end of the course, students will be able to enhance knowledge through a research project with clear planning on research progress and completion.

FIS5996 : Project III
Credit Hours : 6 (0+6)
This course aims to expose students to an independent research project under the guidance of the supervisor. This course involves the collection of literature, indexing, conducting a research project, sampling from populations, compiling data and thoroughly interprete the findings. Students will be required to present and report the research outcomes. At the end of the course, students will be able to demonstrate capability to independently conduct a scientific research on a relevant topic.

5.0 Master of Science In Tropical Fisheries

Elective Course Synopsis

FIS5123 : Marine Pollution and Fisheries
Credit Hours : 3 (2+1)
This course provides an in-depth argument on the issues of marine pollution, its impacts and the management attempts to mitigate the problem. Major issues including; agrochemicals and agriculture, domestic waste and sewage, organic pollutants, radioactive contamination, heavy metals and trace elements, plastic, sediments and biological pollution, and their impact on the fisheries resources will be covered in the subject. The students will also be introduced to various management approaches and its respective challenges in overcoming the issues. At the end of the course, students will need to review and analyses the current state of pollution management in various tropical countries in pertinent to their fisheries resource from the sustainability viewpoint.

FIS5133 : Fishery Molecular Ecology
Credit Hours : 3 (3+0)
This course aims to expose students to advance concepts and skills in sustainable management of fishery resources through molecular approaches. In this course, basic principles of ecological genetics and population genetics as well as the application of molecular markers in the ecological and evolutionary aspects of fish will be emphasized. Molecular techniques which are commonly used in fish population studies such as species identification, phylogeny, phylogeography, and conservation unit determination will also be discussed. Current issues related to threatened aquatic biodiversity and associated conservation strategies will also be discussed. Students will also be trained to conduct case study in fisheries molecular ecology encompassing the process of sampling, voucher specimens preparation, data analysis and scientific report writing.

5.0 Master of Science In Tropical Fisheries

FIS5143 : Fisheries Limnology and Oceanography
Credit Hours : 3 (3+0)
The aim of this course is to express an understanding on fisheries in freshwater and marine ecosystems. Topics covered include the roles of fish response to environmental variation, adaptation of fish by natural selection, and subsequent ecological diversification in generating fish species diversity and allowing population and community persistence. Students also will be exposed to the methods and techniques to evaluate environmental changes as well as changes in fish and other aquatic animal's population. At the end of the course, students will be able to explain similarities and differences in the ways that fish maintain fitness and interact with other biota in both ecosystems.

FIS5153 : Sport and Game Fishing
Credit Hours : 3 (3+0)
The aim of this course is to introduce the students to the global sports and games fishing industries and its regulations. Topics covered include the famous freshwater and saltwaters fish species, the fishing methods used, famous sport fishing area in the world, ethics and principles, rules and regulations applied and industrial importants as well as its related industries. The students will also gain experiences in applying sports fishing activities by field work and workshop.

FIS5223 : Fisheries Product Innovation
Credit Hours : 3 (2+1)
This course provides the principles of fisheries product development. It involves eight steps namely, idea generation and screening, testing the concept, business analytics, marketability test, product development, commercialization, launching and pricing of the products. Students will also be given opportunity to develop and apply innovation element in their own product.

5.0 Master of Science In Tropical Fisheries

FIS5163 : Coral Reef Fisheries
Credit Hours : 3 (3+0)
This course will introduce students to the fishing practices in coral reef. The course also covers the importance of coral reef, the diversity of fishery resources, the destructive fishing gears, and the management of coral reef fisheries. Students will be exposed to the concept of marine protected area and Coral Triangle Initiative – coral reef, fisheries and food security applied in our region. At the end of the course, students are able to understand the threats and impacts on coral reef fisheries and the effective approach to manage coral reef fisheries

FIS5173 : Fisheries Bioinformatics
Credit Hours : 3 (3+0)
This course discusses the needs and importance of bioinformatics in research and management of fisheries resources. Models and algorithms used in molecular phylogenetic analysis, prediction and functional annotation of genes and proteins will be introduced. Concepts and application of bioinformatics softwares used to analyse biological molecules data related to health, nutrition and reproduction of aquatic organisms will be emphasized. Bioinformatics tools in predictive ecology and their applications to fisheries such as the Bayesian networks and hidden Markov model will also be discussed. At the end of the course, students will be able to evaluate the capabilities and effectiveness of various bioinformatics tools in molecular phylogenetic and phylogeography analyses as well as be able to integrate models in predictive ecology for better management of fisheries resources.

5.0 Master of Science In Tropical Fisheries

FIS5183 : Habitat Replenishment Areas
Credit Hours : 3 (3+0)

This course is designed to introduce the students with various concepts of replenishment of degraded fisheries habitat in the coastal waters. The course begins with lectures on various commonly practiced destructive fishing gears in the coastal waters. The destructions following physical development will also be discussed. Then the discussion continues with mitigating measures to replenish and protecting the degraded habitats. This will include various methods of fishing habitat restoration including installation of artificial reefs, ships wrecks, and policies. Monitoring of recovery rates in the affective replenished areas will also be discussed.

FIS5193 : Fisheries Post-Harvest Technology
Credit Hours : 3 (2+1)

The course provides knowledge on process and/or activities immediately after catch, handling and transportation, processing and distribution of fish and fish products. It covers the aspects of physicochemical and biochemical changes, method of quality assessment and current technological development for product shelf-life extension.

5.0 Master of Science In Tropical Fisheries

FIS5203 : Biosecurity and Seafood Safety
Credit Hours : 3 (2+1)

The aim of this course is to emphasize the importance of biosecurity and seafood safety. It is also aims to provide students to the best management concept that can be used in aquaculture with the development of an environmental friendly and sustainable sector. Topics covered include a food-chain perspective from chemical contaminants in farmed fish and potential impact on human health and also methods of improving fish health, quality and safety, as well as managing such issues. Students will also learn about good aquaculture practices (GAP) in different aspects of best practice which includes local and global nature of aquaculture, roles of stakeholders, compliance issues in the authorization of new projects, and environmental, management and operational specifications that make up best practices around aquaculture.

FIS5213 : Fisheries   Biosystems
Credit Hours : 3 (3+0)

The course aims to introduce students to fisheries biosystems and its concept, importance and application in sustainable fisheries management. It comprises of several main topics including introduction to fisheries biosytems, component of fisheries biosystems, mechanism and function of biosystems in fisheries. The course will also look into the interaction between fish population with their biotic and abiotic environment based on the biological and molecular aspects. The integration of basic biological information with genomics, transcriptomics and metabolomics of the organisms will also be introduced. In addition, the application of the systems towards sustainable fisheries management will be discussed. At the end of this course, student should be able to analyze and outline the application of various biological systems for management of fisheries resources.