The content in this programme guidebook is true in time of printing. The School of Fisheries and Aquaculture Sciences has the right to alter the content of any section in this book without prior notice.
PHILOSOPHY

Knowledge and practice based on the faith to God is the pillar of the university, providing competent human capital for the benefit of mankind

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, global sustainability
For further inquiries of Master of Science in Aquaculture, please contact:

Prof. Dr. Abol Munafi bin Ambok Bolong  
Head of Programme  
Master of Science in Aquaculture (Coursework)  
School of Fisheries and Aquaculture Sciences  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu, Terengganu Darul Iman  
Phone: 609-668 5032  
Email: munafi@umt.edu.my  
Fax: 609-668 5002

Dr. Noordiyana binti Mat Noordin  
Programme Coordinator  
Master of Science in Aquaculture (Coursework)  
School of Fisheries and Aquaculture Sciences  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu, Terengganu Darul Iman  
Phone: 609-668 5024  
Email: diyananoordin@umt.edu.my  
Fax: 609-668 5002

or

Academic Management Department  
Pusat Pengajian Siswazah  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu, Terengganu Darul Iman  
Phone: 09-668 4532/ 4219  
Fax: 09-668 4143
# Academic Calendar

**Master of Science in Aquaculture**

**Programme by Coursework**

### Semester I 2015/2016

<table>
<thead>
<tr>
<th>Activities</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration</td>
<td>September 7, 2015 to September 13, 2015</td>
<td>1 week</td>
</tr>
<tr>
<td>Deferment of Registration</td>
<td>September 7, 2015 to October 6, 2015</td>
<td>1 month</td>
</tr>
<tr>
<td>Lectures</td>
<td>September 14, 2015 to November 7, 2015</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Mid-Term Break</td>
<td>November 8, 2015 to November 14, 2015</td>
<td>1 week</td>
</tr>
<tr>
<td>Lectures</td>
<td>November 15, 2015 to December 26, 2015</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Study Week</td>
<td>December 27, 2015 to January 2, 2016</td>
<td>1 week</td>
</tr>
<tr>
<td>Examination</td>
<td>January 3, 2016 to January 16, 2016</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Semester Break</td>
<td>January 17, 2016 to February 13, 2016</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Result Announcement</td>
<td>February 7, 2016 to February 7, 2016</td>
<td>1 day</td>
</tr>
<tr>
<td>Appeal Against Result</td>
<td>February 7, 2016 to February 14, 2016</td>
<td>1 week</td>
</tr>
</tbody>
</table>

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

### Semester II 2015/2016

<table>
<thead>
<tr>
<th>Activities</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration</td>
<td>February 15, 2016 to February 20, 2016</td>
<td>1 week</td>
</tr>
<tr>
<td>Deferment of Registration</td>
<td>February 15, 2016 to March 14, 2016</td>
<td>1 month</td>
</tr>
<tr>
<td>Lectures</td>
<td>February 21, 2016 to April 2, 2016</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Mid-Term Break</td>
<td>April 3, 2016 to April 9, 2016</td>
<td>1 week</td>
</tr>
<tr>
<td>Lectures</td>
<td>April 10, 2016 to June 4, 2016</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Study Week</td>
<td>June 5, 2016 to June 11, 2016</td>
<td>1 week</td>
</tr>
<tr>
<td>Examination</td>
<td>June 12, 2016 to June 25, 2016</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Semester Break</td>
<td>June 26, 2016 to September 3, 2016</td>
<td>10 weeks</td>
</tr>
<tr>
<td>Result Announcement</td>
<td>August 28, 2016 to September 28, 2016</td>
<td>1 day</td>
</tr>
<tr>
<td>Appeal Against Result</td>
<td>August 28, 2016 to September 4, 2016</td>
<td>1 week</td>
</tr>
</tbody>
</table>
Assalamualaikum Warahmatullahi Wabarakatuh and Salam Sejahtera,

It is a great pleasure for me to welcome you to School of Fisheries and Aquaculture Sciences, Universiti Malaysia Terengganu, a place where a conducive and hands-on learning environment will be a great contribution to your future success. School of Fisheries and Aquaculture Sciences, also known as FiSHA has strong track record of undergraduate teaching and ever growing reputation for discovery, innovation and research excellence. With dedicated academician specialized in various subfield of fisheries and aquaculture, we are passionate to equip our students with strong foundation through fundamental knowledge, innovative research endeavors and practical training. This will allow our graduates to have the knowledge, skills and competence needed not only to succeed in the course they enrolled but also beyond in the future.

Master of Science in Aquaculture (coursework) is a programme that has been approved by the Ministry of Higher Education Malaysia on December 6, 2004. It was then offered for the first time in 2005 under Institute of Aquaculture Tropical before FiSHA took over in 2013. To further strengthen the course, we have spent considerable time revising the curricula and decided to offer more comprehensive courses and shorten the years to complete the programme from 18 months to only 12 months of study. This programme aims to support the development of the aquaculture industry by producing more qualified human resources in key areas of aquaculture with good attitude of professionalism and ethics. We also proud to mention that we are the only local university in Malaysia offering this programme to assist the students to master the knowledge in the field of aquaculture and manage the knowledge effectively for development of aquaculture industry not only in Malaysia but also globally.

It is our vision to see FiSHA continues to be the leading centre in the field of aquaculture in both research and academic programmes. Our students are our reflective agents and you will be part of the success that we will continue to create together. Last but not least, I would like to congratulate all of you for being the students of Master of Science in Aquaculture programme. I hope with the presence of highly talented and dedicated academician in FiSHA, you will achieve your full potential and enhance your interest and commitment in aquaculture field. I wish all of you a great success.

Prof. Dr. Mazlan Abd. Ghaffar
Dean
School of Fisheries and Aquaculture Sciences
Universiti Malaysia Terengganu
7 September 2015
# CONTENTS

## BACKGROUND OF SCHOOL OF FISHERIES AND AQUACULTURE SCIENCES
- Introduction
- The Objectives of School

## ADMINISTRATION OF SCHOOL OF FISHERIES AND AQUACULTURE SCIENCES

## ACADEMICIANS

## LABORATORY MANAGEMENT

## ACADEMIC SYSTEM
- Semester System
- Credit Hours
- Credit hours requirement for graduation for Master of Sciences in Aquaculture Programme
- Curriculum
- Programme Scheme
- Course Selection
- Others

## MASTER OF SCIENCE IN AQUACULTURE
- Admission Requirement
- List of Courses
- Programme Scheme
- Course Synopsis

## DIRECTORY
- Administration
BACKGROUND
SCHOOL OF FISHERIES AND AQUACULTURE SCIENCES

Introduction

School of Fisheries and Aquaculture Sciences was established on December 1, 2013, in line with the academic transformation of the Universiti Malaysia Terengganu. The academic programmes are designed towards producing skilled personnel in the field of fisheries and aquaculture to meet the needs of the industry.

Programmes offered

The school offers various levels of fisheries and aquaculture programmes which combines science, technology, management and entrepreneurship that will produce globally competitive graduates. All of the programmes are accredited by the MQA and the contents are revised periodically according to the needs of the industry.

The programmes are as follows:

1. Undergraduate Programmes
   a) Diploma in Fisheries
   b) Bachelor of Applied Sciences (Fisheries)
   c) Bachelor of Agrotechnology Sciences (Aquaculture)

2. Postgraduate Programmes
   a) By Coursework
      i. Master of Science in Aquaculture
      ii. Master of Science in Sustainable Tropical Fisheries
   b) By Research
      i. Master of Science
      ii. Doctor of Philosophy

Offering programmes in the field of fisheries and aquaculture is a pragmatic step towards upgrading the level and quality of fisheries and aquaculture industry in Malaysia. The School aims to develop trained manpower in the field of fisheries and aquaculture, that are competitive, have high self-esteem and virtuous to meet the needs of the workforce.

The School will be able to play its role in the aspect of mastery of various knowledge and skills in applied science and agrotechnology, teaching and learning, through approaches, methods and recent findings in line with government policy and the aspirations of the people.

The School of Fisheries and Aquaculture Sciences is located on the campus of Universiti Malaysia Terengganu in Mengabang Telipot, 25 km from Kuala Terengganu and 10 km from Sultan Mahmud Airport.

Objectives

1. To bring together expertise in the field of fisheries and aquaculture sciences under one organisation and providing the best opportunity for network integration and consolidation;
2. To offer the quality programmes to meet current and future needs in the field of fisheries and aquaculture science;
3. To explore the knowledge in relevant fields through fundamental and exploratory research;
4. To provide the latest facilities to support the development of knowledge, education and academics; and
5. To produce graduates who are knowledgeable, confident and competent in fisheries and aquaculture field.
## 1.0 Administration of School of Fisheries and Aquaculture Sciences

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dean</td>
<td>PROF. DR. MAZLAN ABD. GHAFFAR</td>
<td>School of Fisheries and Aquaculture Sciences</td>
</tr>
<tr>
<td>Deputy Dean Academic &amp; Students</td>
<td>PROF. DR. ABOL MUNAFI BIN AMBOK BOLONG</td>
<td></td>
</tr>
<tr>
<td>Deputy Dean Talent &amp; Research</td>
<td>PROF. DR. NAJIAH BINTI MUSA ZAKARIA</td>
<td></td>
</tr>
<tr>
<td>Head of Programme Master of Science in Aquaculture (Coursework)</td>
<td>PROF. DR. ABOL MUNAFI BIN AMBOK BOLONG</td>
<td></td>
</tr>
<tr>
<td>Head of Programme Bachelor of Agrotechnology Sciences (Aquaculture)</td>
<td>DR. SHAHREZA BIN MD. SHERIFF</td>
<td></td>
</tr>
<tr>
<td>Head of Programme Bachelor of Applied Sciences (Fisheries)</td>
<td>PROF. MADYA DR. HII YII SIANG</td>
<td></td>
</tr>
<tr>
<td>Head of Programme Diploma in Fisheries</td>
<td>DR. NUR ASMA BINTI ARIFFIN</td>
<td></td>
</tr>
<tr>
<td>Head of Administration</td>
<td>MR. ZUL-ATFI BIN HASHIM</td>
<td></td>
</tr>
</tbody>
</table>
2.0 ACADEMICIAN

Professor

Prof. Dr. Mazlan Abd. Ghaffar
BSc. (UPM), MSc. (University of Newcastle), PhD. (University of Wales)
Field : Fisheries
Expertise : Fish Biology
Specialization : Ichthyology, Fish Behaviour, Fish Physiology
Phone : 609 668 5153
Email : mag@umt.edu.my

Prof. Emeritus Dr. Mohd Azmi bin Ambak
BSc. (Malaya), MSc. (Salford), PhD. (UPM)
Field : Fisheries
Expertise : Fish Biology & Ecology
Specialization : Fish Stock Assessment, Fishery Management, Fish Taxonomy
Phone : 609 668 5016
Email : ambak@umt.edu.my

Prof. Emeritus Dr. Faizah binti Mohd Shaharom
B.Sc. (Hons.) (Queensland), Ph.D. (Stirling)
Field : Zoology
Expertise : Parasitology, Marine Biology
Specialization : Fish Parasitology, Fish Disease
Phone : 609 668 5013
Email : faizah@umt.edu.my

Prof. Dr. Anuar bin Hassan
BSc. (Hons.) (Malaya), MSc., PhD. (Nagasaki)
Field : Aquaculture
Expertise : Fish Breeding Technology
Specialization : Fish Breeding
Phone : 609 668 4507
Email : anuar@umt.edu.my

Prof. Dr. Mohd Effendy Abd. Wahid
DAHP, DVM, Ph.D (UPM)
Field : Veterinary
Expertise : Immunology, Histology
Specialization : Immunopathology, Vaccinology
Phone : 609 668 5160
Email : effendy@umt.edu.my

Prof. Dr. Abol Munafi bin Ambok Bolong
BSc. (UPM), MSc. (Kochi), PhD. (Ehime)
Field : Aquaculture
Expertise : Hatchery Technology
Specialization : Fish Breeding, Larval Rearing
Phone : 609 668 4868
Email : munafi@umt.edu.my

Assoc. Professor

Prof. Dr. Najiah binti Musa @ Zakaria
D.V.M, Ph.D. (UPM)
Field : Veterinary
Expertise : Microbiology
Specialization : Aquatic Animal Health, Bacteriology
Phone : 609 668 5195/5035
Email : najiah@umt.edu.my

Associate Professor

Assoc. Prof. Dr. Hii Yii Siang
BSc., PhD. (UPM)
Field : Marine Science
Expertise : Pollution Studies
Specialization : Water & Sediment Quality Management, Marine Pollution
Phone : 609 668 5017
Email : hii@umt.edu.my

Assoc. Prof. Dr. Wan Muhumad Amir bin W. Ahmad
BSc., MSc., Ph.D. (USM)
Field : Biostatistic
Expertise : Applied Statistic
Specialization : Linear Model
Phone : 609 668 5061/5186
Email : wmamir@umt.edu.my

Lecturer

Dr. Shahreza bin Md. Sheriff
BSc., MSc. (UPM), PhD. (UKM)
Field : Fisheries
Expertise : Fish Genetics
Specialization : Fish Genetic Improvement
Phone : 609 668 4539
Email : shahreza@umt.edu.my

Dr. Nur Asma binti Ariffin
BSc., MSc. (UPM), PhD. (UKM)
Field : Fisheries
Expertise : Fish Genetics
Specialization : Fish Genomics
Phone : 609 668 4538
Email : nurasma@umt.edu.my

Dr. Muhd Danish Daniel bin Abdullah
BSc.(Hons.), Ph.D. (UKM)
Field : Ocean Science
Expertise : Marine Microbiology & Biotechnology
Specialization : Microbial Ecogenomics
Phone : 609 668 5032
Email : mdda@umt.edu.my
Dr. Nadirah binti Musa
BSc., MSc. (UKM), PhD. (Stirling)
Field : Biology
Expertise : Fish Physiology
Specialization : Aquatic Eco Physiology
Phone : 609 668 5036
Email : nadirah@umt.edu.my

Dr. Nurul Ulfah binti Karim
BSc. (KUSTEM), PhD. (Queen’s University, Belfast)
Field : Fisheries
Expertise : Fisheries Post Harvest
Specialization : Seafood Safety & Quality
Phone : 609 668 5022
Email : ulfah@umt.edu.my

Dr. Seah Ying Giat
BSc. (Hons.), MSc., PhD. (UKM)
Field : Ocean Science
Expertise : Fish Taxonomy
Specialization : Marine Fish Taxonomy
Phone : 609 668 5021
Email : ygseah@umt.edu.my

Dr. Noordiyana binti Mat Noordin
BSc. (KUSTEM), PhD. (James Cook)
Field : Aquaculture
Expertise : Aquaculture Nutrition
Specialization : Nutritional Physiology
Phone : 609 668 5024
Email : diyananoordin@umt.edu.my

Dr. Nor Omaima binti Harun
BSc. (UPM), MSc., PhD. (Aberdeen)
Field : Zoology
Expertise : Immunology
Specialization : Fish Immunology
Phone : 609 668 3387/5047
Email : omaima@umt.edu.my

Dr. Wan Mohd Rauhan bin Wan Hussin
BSc. (UPM), MSc. (UMT), PhD. (St. Andrews)
Field : Fisheries
Expertise : Benthic Ecology
Specialization : Benthic Community & Ecosystem Function
Phone : 609 668 5026
Email : rauhan@umt.edu.my

Dr. Nor Fazliyana binti Mahtar @ Mohtar
BSc. (UMT), PhD. (Auckland)
Field : Aquaculture
Expertise : Food Chemistry
Specialization : Fishery By-Products
Phone : 609 668 4540
Email : fazliyana@umt.edu.my

Dr. Mok Wen Jye
BSc., MSc. (UMS), PhD. (Kinki)
Field : Aquaculture
Expertise : Seafood Safety
Specialization : Heavy Metal Contamination
Phone : 609 668 4998
Email : mok.jye@umt.edu.my

Dr. Sharifah Noor Emilia binti Syed Jamil Fadaak
BSc. (UMS), MSc., PhD. (Kinki)
Field : Aquaculture
Expertise : Aquatic Microbiology
Specialization : Aquatic Microbial Ecology
Phone : 609 668 4918
Email : emilia@umt.edu.my

Dr. Tan Min Pau
BSc., PhD. (USM)
Field : Biology
Expertise : Molecular Ecology
Specialization : Evolutionary Ecology
Phone : 609 668 4917
Email : mptan@umt.edu.my

Dr. Ivan Koh Chong Chu
BSc., MSc. (UMS), PhD. (Kinki)
Field : Aquaculture
Expertise : Seed Production Technology
Specialization : Sperm Cryopreservation
Phone : 609 668 5037
Email : ivankcc@umt.edu.my

Dr. Sharifah Rahmah binti Syed Muhammad
BSc., MSc. (UMS), PhD. (Kinki)
Field : Biology
Expertise : Aquaculture
Specialization : Population Genetic Structure
Phone : 609 668 5043
Email : sharifah.rahmah@umt.edu.my

Dr. Tun Nurul Aimi binti Mat Jaafar
BSc. (UMT), PhD (Bangor)
Field : Aquaculture
Expertise : Molecular Ecology
Specialization : Population Genetic Structure
Phone : 609 668 5033
Email : tun.aimi@umt.edu.my

Dr. Sandra Catherine A/P Zainathan
BSc. (Hons.) (KUSTEM), PhD. (UTAS)
Field : Fisheries
Expertise : Aquatic Virology
Specialization : Molecular Virology
Phone : 609 668 5028
Email : sandra@umt.edu.my
Tutor

Wan Nurul Nadiah binti Wan Rasdi (Study Leave)
BSc., MSc. (UMT)
Field : Aquaculture
Expertise : Live Feed Culture
Email : nadiah.rasdi@umt.edu.my

Lokman Nor Hakim bin Norazmi (Study Leave)
BSc. (KUSTEM), MSc. (UMT)
Field : Aquaculture
Expertise : Reproductive Physiology (Fish)
Phone : 609 668 3805
Email : lokhakim@umt.edu.my

Roslizawati binti Ab. Lah (Study Leave)
BSc. (KUSTEM), MSc. (Bergen)
Field : Aquaculture
Expertise : Immunology (Mollusc)
Email : ros.ablah@umt.edu.my

Academic Fellows

Mohd Fazrul Hisam bin Abd. Aziz (Study Leave)
Dip., BSc. (UMT), MSc. (UTM)
Field : Fisheries
Expertise : Fishing Gear Technology, Marine and Coastal Resources Management
Email : md.fazrul@umt.edu.my

Nurul Aqilah binti Iberahim (Study Leave)
BSc. (UMS), MSc. (UMT)
Bidang : Aquaculture
Kepakaran : Fish Mykology
Email : aqilah.iberahim@umt.edu.my
Head of Division  
Aquaculture Management  
Mr. Rohisyamuddin bin Othman  
Dip. Fish., BSc. (UPM), MSc. (UMT)  
Phone : 609 668 5008  
Email : din@umt.edu.my

Fisheries Officers  
Mr. Kamarul Azwan bin Kadir  
Dip. Fish., BSc. (UPM)  
Phone : 609 668 5006  
Email : azwan@umt.edu.my  
Mr. Mohd Noor Azman bin Senu  
Dip. Fish. BSc. (UPM)  
Email : azmansenu@umt.edu.my  
Mr. Khairul Anuar bin Kamarudin  
B. Applied Sc. (UMT)  
Phone : 609 668 3643  
Email : khairul-a@umt.edu.my  
Mr. Mohd. Azman b. Yusoff  
B. Applied Sc. (UMT)  
Phone : 609 668 5056  
Email : azmanyusoff@umt.edu.my

Head of Division  
Fisheries Management  
Mr. Baharim bin Mustapa  
Dip. Fish., BSc. (UPM)  
Phone : 609 668 5005  
Email : baharim@umt.edu.my

Science Officer  
Mrs. Suzana binti Sukri  
B.Applied Sc. (USM)  
Phone : 609 668 5007  
Email : suzanasukri@umt.edu.my  
Mr. Mohd Shahrizan Azrul bin Aziz  
B.Applied Sc. (UMT)  
Phone : 609 668 5040  
Email : shahrizan@umt.edu.my
4.0 ACADEMIC SYSTEM

4.1 Semester System
The 2015/2016 academic session at UMT starts from September 7, 2015 to September 4, 2016 for Master of Science in Aquaculture Programme.

Every academic year consists of two (2) semesters, Semester I and II where each of them consists of 17 weeks (14 weeks of lectures and 3 weeks of examinations).

4.2 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)

4.3 Credit hour requirements for graduation for Master of Sciences in Aquaculture Programme
The minimum credit hours required for graduation for Master of Science in Aquaculture programme is 40 (credit hours).

4.4 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.

4.5 Programme Scheme
The programme scheme is important and has ben alligned with the educational goals of the university. Details of the programme scheme for the programme can be referred at the respective page.

4.6 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 B. Shall they fail, they have to repeat the respective course.

ii. Elective
Elective courses are courses to be chosen by students from any school based on their interest and their potential. Students are required to take minimum 6 credit hours as listed in the programme scheme. Elective courses will be graded and their credit hours will also be taken into account.
4.7 Others

i. Fees/Debt

Students who still owe or do not have a 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 School for record purposes.
5.0 MASTER OF SCIENCE IN AQUACULTURE

5.1 Admission Requirement

1. Bachelor’s degree with CGPA 2.75 and above in sciences, engineering, economics, social sciences and management or;

2. Any other qualification equivalent to the related field and/or have a working experience in related field.

3. Demonstrate competency in English, satisfactory to the requirements of the University.

5.2 List of Courses

Core Course (34 credit hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA 6014</td>
<td>Research Methodology</td>
<td>4 (3+1)</td>
</tr>
<tr>
<td>SA 6024</td>
<td>Biosecurity and Seafood Safety</td>
<td>4 (3+1)</td>
</tr>
<tr>
<td>SA 6034</td>
<td>Sustainable Aquaculture</td>
<td>4 (4+0)</td>
</tr>
<tr>
<td>SA 6223</td>
<td>Special Topics in Aquaculture</td>
<td>3 (3+0)</td>
</tr>
<tr>
<td>SA 6224</td>
<td>Aquaculture Business Management</td>
<td>4 (3+1)</td>
</tr>
<tr>
<td>SA 6243</td>
<td>Fish Health Management</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6253</td>
<td>Advance in Post Harvest Technology</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6233</td>
<td>Fish Nutrition</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6083</td>
<td>Case Study I</td>
<td>3 (1+2)</td>
</tr>
<tr>
<td>SA 6263</td>
<td>Case Study II</td>
<td>3 (0+3)</td>
</tr>
</tbody>
</table>

Elective Course (6 credit hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA 6043</td>
<td>Advanced Fish Nutrition and Physiology</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6063</td>
<td>Open Water Aquaculture System</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6073</td>
<td>Fish Reproductive Physiology</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6103</td>
<td>Live Feed Technology</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6173</td>
<td>Advanced Aquaculture Systems Design</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6213</td>
<td>Advanced Seed Production</td>
<td>3 (3+0)</td>
</tr>
</tbody>
</table>

* Students are required to take at least 6 credit hours of any elective courses offered by these school or any equivalent standard courses offered by other school.
## 5.3 PROGRAMME SCHEME

### SEMESTER I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA 6014</td>
<td>Research Methodology</td>
<td>4 (3+1)</td>
</tr>
<tr>
<td>SA 6024</td>
<td>Biosecurity and Seafood Safety</td>
<td>4 (3+1)</td>
</tr>
<tr>
<td>SA 6034</td>
<td>Sustainable Aquaculture</td>
<td>4 (4+0)</td>
</tr>
<tr>
<td>SA 6083</td>
<td>Case Study I</td>
<td>3 (1+2)</td>
</tr>
<tr>
<td>SA 6223</td>
<td>Special Topics in Aquaculture</td>
<td>3 (3+0)</td>
</tr>
<tr>
<td>XX XXXX</td>
<td>Elective Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

### SEMESTER II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA 6224</td>
<td>Aquaculture Business Management</td>
<td>4 (3+1)</td>
</tr>
<tr>
<td>SA 6263</td>
<td>Case Study II</td>
<td>3 (0+3)</td>
</tr>
<tr>
<td>SA 6243</td>
<td>Fish Health Management</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6253</td>
<td>Advance in Post harvest technology</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>SA 6233</td>
<td>Fish Nutrition</td>
<td>3 (2+1)</td>
</tr>
<tr>
<td>XX XXXX</td>
<td>Elective Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total</strong></td>
<td><strong>19</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
5.4 COURSE SYNOPSIS

SA 6014 : RESEARCH METHODOLOGY  
Credit Hours: 4 (3+1)  
This course exposes students the importance of scientific analysis of empirical data and ethical reporting in science. Students will be exposed to design of experiments, sampling from populations and hypothesis testing. The common statistical techniques used in aquaculture include student t-test, multiple comparisons, data transformation, correlation, regression, and non-parametric statistics. At the end of the course, students will be able to report statistical results and practice scientific writing principles.

SA 6024 : 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 also aims to provide students the best biosecurity management concept that can be used to develop an environmentally responsible and sustainable aquaculture. 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 (GAqP) 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.

SA 6034 : 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.

SA6223 : 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.
SA6224 : AQUACULTURE BUSINESS MANAGEMENT  
Credit Hours : 4 (3+1)

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 describes 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.

SA6243 : FISH HEALTH MANAGEMENT  
Credit Hours : 4 (3+1)

This course introduces students concepts regarding maintenance of health quality of cultured fish. Principles of diagnosis and proper diagnostic techniques, use of chemotherapeutants and biological control will be taught to students. Important pathogenic diseases in aquaculture caused by parasites, bacteria and virus will be highlighted. Disease due to nutritional imbalance and other disease not caused by pathogens will be discussed.

SA6253 : ADVANCE IN POST HARVEST TECHNOLOGY  
Credit Hours : 3 (2+1)

This course emphasizes on the quality control of live and fresh fish during handling, transportation and storage with application of HACCP; physicochemical and biochemical changes. Methods of quality assessment and factor which contribute to fish spoilage; refrigeration, depuration of fish fin and shellfish; current technological development in post-harvest technology. Quality regulation related to fish and fishery products.

SA6233 : FISH NUTRITION  
Credit Hours : 3 (2+1)

This course emphasize on farmed fish and shrimp nutrition, feeding regimes and behavior in relation to aquaculture. Understanding of nutrition and dietary requirements for all cultivated aquaculture species. Explore of an importance of five different nutrients such as proteins, lipids, carbohydrates, vitamins and minerals. Comprehensive study on the science of aquaculture nutrition and feeding concerned with these dietary nutrients to finfish and shrimp culture. Role of natural’s food organisms and the benefit of artificial diets in aquaculture systems. Feed formulation; pellets, micro-encapsulated diets, artificial planktons, etc and storage.

SA6083 : CASE STUDY I  
Credit Hours : 3 (1+2)

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

SA6263 : CASE STUDY II  
Credit Hours : 3 (0+3)

The course emphasizes on writing of technical report based on current issues in aquaculture. Scientific information presented in the proposal must cover latest knowledge in research, different research techniques and development as well as advance technology in respective field. Emphasis should be given on originality and ability to do critical analysis on the literature.
SA6043 : 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.

SA6063 : 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.

SA6073 : 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.

SA6103 : 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.
SA6173 : 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.

SA6213 : ADVANCED SEED PRODUCTION  
Credit Hours : 3 (3+0)  
The aim of this course is to provide understanding in fish breeding and its importance in aquaculture. In this course, student will be exposed to several main topics comprises of introduction to fish breeding, advance breeding techniques including monosex production, polyploidy, androgenesis and gynogenesis. It also discusses about chromosomal genetics and concept of selective breeding, sex determination and control in fish production. In this course, student will also be exposed to concept of SFP and SPR, application of biotechnology in fish breeding, and the impact of genetic improvement programme towards wild stocks and the ecosystem. At the end of the course, student should be able to apply the knowledge in fish breeding in aquaculture seed production.
# Directory

## Administration

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Designation</th>
<th>Email</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Prof. Dr. Mazlan Abd. Ghaffar</td>
<td>Dean</td>
<td><a href="mailto:mag@umt.edu.my">mag@umt.edu.my</a></td>
<td>5153</td>
</tr>
<tr>
<td>2.</td>
<td>Prof. Dr. Abol Munafi Ambok Bolong</td>
<td>Deputy Dean (Academic &amp; Student)</td>
<td><a href="mailto:munafi@umt.edu.my">munafi@umt.edu.my</a></td>
<td>4868</td>
</tr>
<tr>
<td>3.</td>
<td>Prof. Dr. Najiah Musa</td>
<td>Deputy Dean (Talent dan Research)</td>
<td><a href="mailto:najiah@umt.edu.my">najiah@umt.edu.my</a></td>
<td>5195/5035</td>
</tr>
<tr>
<td>4.</td>
<td>Prof. Dr. Abol Munafi Ambok Bolong</td>
<td>Head of Programme Master of Science in Aquaculture (Coursework)</td>
<td><a href="mailto:munafi@umt.edu.my">munafi@umt.edu.my</a></td>
<td>5032</td>
</tr>
<tr>
<td>5.</td>
<td>Dr. Shahreza Md. Sherif</td>
<td>Head of Programme Bachelor of Agrotechnology Sciences (Aquaculture)</td>
<td><a href="mailto:shahreza@umt.edu.my">shahreza@umt.edu.my</a></td>
<td>4539</td>
</tr>
<tr>
<td>6.</td>
<td>Prof. Madya Dr. Hii Yii Siang</td>
<td>Head of Programme Bachelor of Applied Sciences (Fisheries)</td>
<td><a href="mailto:hii@umt.edu.my">hii@umt.edu.my</a></td>
<td>5014</td>
</tr>
<tr>
<td>7.</td>
<td>Dr. Nur Asma Ariffin</td>
<td>Head of Programme Diploma in Fisheries</td>
<td><a href="mailto:nurasma@umt.edu.my">nurasma@umt.edu.my</a></td>
<td>4538</td>
</tr>
<tr>
<td>8.</td>
<td>Mr. Zul-Atfi Hashim</td>
<td>Head of Administration</td>
<td><a href="mailto:atfi@umt.edu.my">atfi@umt.edu.my</a></td>
<td>4139</td>
</tr>
<tr>
<td>9.</td>
<td>Mrs. Norizan Ismail</td>
<td>Assistant Registrar</td>
<td><a href="mailto:norizanismail@umt.edu.my">norizanismail@umt.edu.my</a></td>
<td>4421</td>
</tr>
<tr>
<td>10.</td>
<td>Office/ Counter for Post Graduate Programme</td>
<td>-</td>
<td>-</td>
<td>5001</td>
</tr>
<tr>
<td>11.</td>
<td>Office/ Counter for Diploma and Under Graduate Programme</td>
<td>-</td>
<td>-</td>
<td>5003</td>
</tr>
<tr>
<td>12.</td>
<td>Fax Number (Office)</td>
<td>-</td>
<td>-</td>
<td>09-6685002</td>
</tr>
</tbody>
</table>

15
ocean of discoveries, global sustainability

www.fisha.umt.edu.my