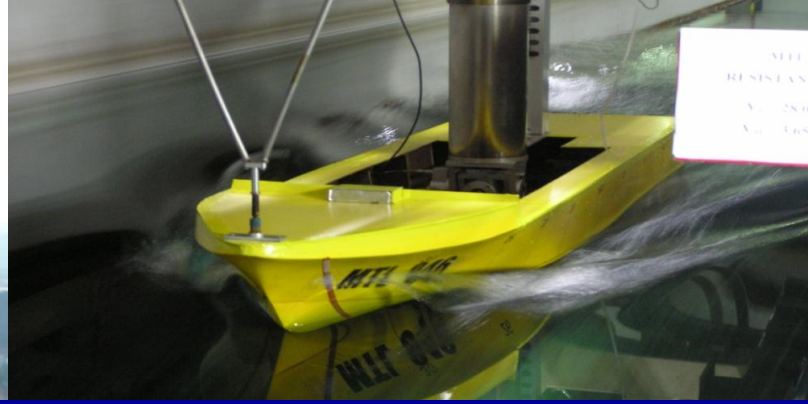


MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

**Programme of Aeronautics, Automotive and Ocean
Engineering**

School of Mechanical Engineering,
Faculty of Engineering,
Universiti Teknologi Malaysia

SCHOOL OF MECHANICAL ENGINEERING



AUTOMOTIVE, AERONAUTICAL & OCEAN ENGINEERING



Organization Structure

THE NEW MANAGEMENT TEAM

School Management Team is assisted by 3 Deputy Registry & 6 Assistant Registry of Faculty of Engineering.



CHAIR
PROF. Dr. MOHD HASBULLAH IDRIS



ASSOC. CHAIR
(ACADEMIC & STUDENT DEVELOPMENT)
PROF. Dr. IZMAN SUDIN



ASSOC. CHAIR
(QUALITY & STRATEGY)
ASSOC. PROF. Dr. HASLINDA MOHAMED KAMAR



ASSOC. CHAIR
(RESEARCH & ACAMEDIC STAFF)
ASSOC. PROF. Ir. Dr. ZAINI AHMAD



ASSOC. CHAIR
(FASILITY)
ASSOC. PROF. Dr. MOHAMED RUSLAN ABDULLAH



ASSOC. CHAIR
(CONTINUING & TRANSNACIONAL EDUCATION)
Dr. ENSKU MOHAMMD NAZIM ENSKU ABU BAKAR



DIRECTOR
(AERONAUTICS, AUTOMOTIVE & OCEAN ENGINEERING)
ASSOC. PROF. Ir. Dr. PAKHARUDDIN MOHD SAMIN



DIRECTOR
(MATERIALS, MANUFACTURING & INDUSTRIAL ENGINEERING)
ASSOC. PROF. Dr. MUHAMAD AZIZI MAT YAJID



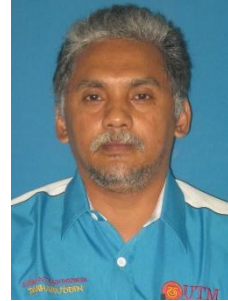
DIRECTOR
(APPLIED MECHANICS & DESIGN)
ASSOC. PROF. Dr. MOHD YAZID YAHYA



DIRECTOR
(THERMO FLUD)
Dr. AMINUDDIN SAAT

Ship and Offshore Engineering Panels

Programme Director



Assoc. Prof. Dr. Pakharuddin bin Mohd Samin

Facts

Prof.	Assoc. Prof.	Ph.D
3	1	6



Prof. Ir. Dr.
Ab Saman
Abd Kader



Prof. Dr.
Omar bin
Yaakob



Prof. Dr. Adi
Maimun bin
Abdul Malik



Assoc. Prof.
Dr. Zamani
bin Ahmad



Hj Yahya Bin
Samian



Nasrudin Bin
Ismail



Dr. Jaswar
Koto



Dr Siow Chee
Loon



Dr. Nik Mohd
Ridzuan bin
Shaharuddin



Dr Kang Hooi
Siang



Dr Farah
Ellyza Hashim



Dr Arifah Ali

Centre of Excellence

- UTM Marine Technology Center



Towing Tank

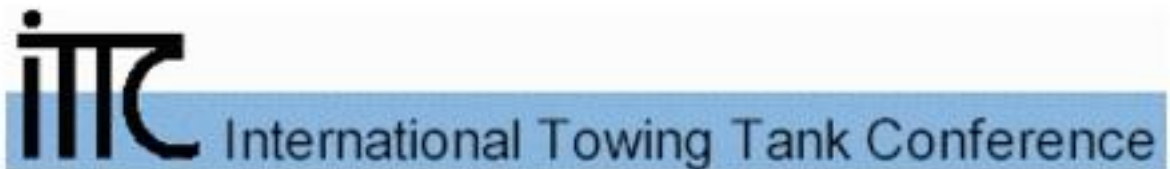


- Length 120 m, width 4 m, water depth 2.5 m
- Flap-type wave maker / absorbing beach
- Towing carriage speed 0.10 – 4.5 m/s
- 32 channel DAQ system



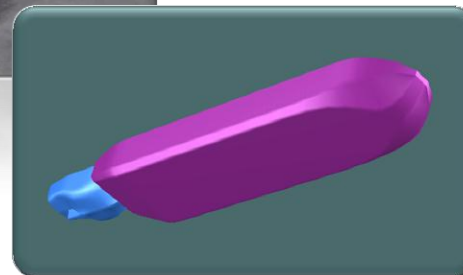
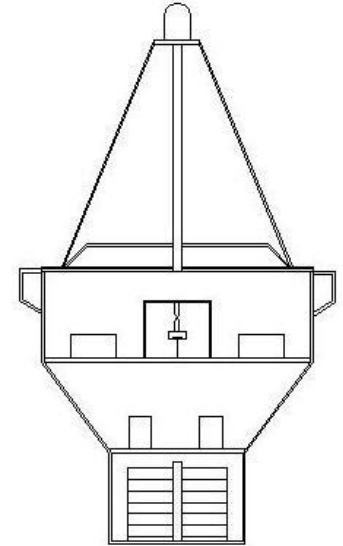
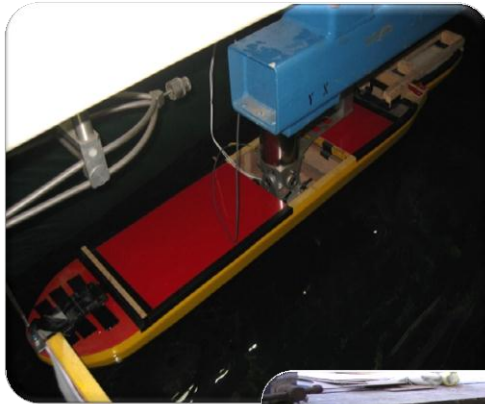
International Recognition

*Marine Technology Centre
(formerly known as Marine Technology Laboratory)
was accepted as full member of the
International Towing Tank Conference (ITTC)
in August 1998.*

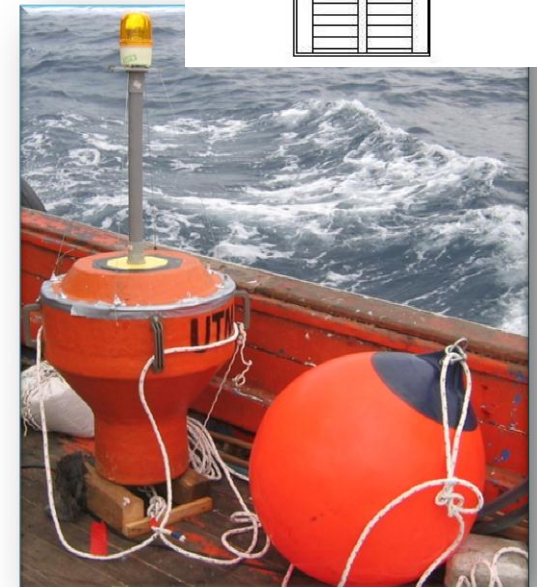


UTM Marine Technology Center (MTC)

Vessel Safety in Damage



Pusher Barge



UTM Marine Technology Center (MTC)



History of Department and The Program

Undergraduate

- 1980 Diploma in Mechanical Engineering (Marine Technology)
- 1981 Bachelor in Mechanical Engineering (Marine Technology)
- 2011 Bachelor in Naval Architecture and Offshore Engineering



Postgraduate

Master of Engineering (Marine Technology)

2013 Master of Sciences (Ship and Offshore Engineering)

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

MASTER BY RESEARCH

Master of Philosophy (Mechanical Engineering)

Master of Philosophy (Marine Technology)

MASTER BY TAUGHT COURSE

1. Master of Science (Mechanical Engineering)
2. Master of Science (Adv. Manufacturing Technology)
3. Master of Science (Materials Engineering)
4. Master of Science (Ship & Offshore Engineering)
5. Master of Science (Industrial Engineering)
6. Master of Science (Aeronautical Engineering)
7. Master of Science (Automotive Engineering)

DOCTOR OF PHILOSOPHY

- PhD (Mechanical Engineering)

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

Programme Objective:

The aim of MSc. (Ship and Offshore Engineering) programme is **to provide students with knowledge and skills which related with ship and offshore engineering field of studies.** After completion of the programme, graduates can apply the knowledge and skills learned through designing, implementing, solving related problems and delivering knowledge and idea effectively to the society in both ship and offshore engineering area.

PROGRAMME OUTCOMES

M.Sc. (Ship and Offshore Engineering)

- | |
|--|
| PO1. Demonstrate advanced knowledge and capabilities in Ship and Offshore engineering to further develop or use these in new situations or multi-disciplinary contexts. |
| PO2. Demonstrate research skills in appraising available information and research evidence, and applying them in Ship and Offshore engineering fields. |
| PO3. Apply critical thinking and problem solving skills in addressing Ship and Offshore engineering problems utilizing relevant tools and techniques. |
| PO4: Perform research in Ship and Offshore engineering problems professionally, ethically and responsibly. |
| PO5: Communicate technical knowledge and ideas effectively in written and oral forms. |
| PO6: Adopt the latest relevant knowledge and technologies through life-long learning |

ADMISSION REQUIREMENT

- The normal requirement for admission of the programme is a **four-year bachelor degree recognized by the university in either engineering or sciences** with a minimum overall grade point average of 2.5 or equivalent.
- Students applying for admission with an overall grade point average of less than 2.5 but with relevant professional experiences (*5 years working experience*) may however be considered.

Duration of study:

Mode of Study	Off Campus Study
Duration	2 years (4 normal + 1 short semester)

- The **off campus student** is allowed to take a maximum of **12 credits** in a normal semester and 6 credits in a short semester.

M.Sc. (Ship and Offshore Engineering)

Programme Structure

Courses	Credit
University Core (1 course only)	3
ULAM 6013 Malay Language for Academic Writing	
Ship and Offshore Engineering Core	18
MKMO 1213 Dynamics of Marine Structures	
MKMO 1713 Ship and Offshore Production Technology	
MKMO 3843 Maritime Management and Law	
MKMO 1903 Research Methodology	
MKMO 2113 Strength and Vibration of Marine Structures	
MKMO 2813 Maritime Safety and Risk	
Electives (9 credits only)	9
MKMO 1413 Dynamics of Marine Power Plant	
MKMO 1913 Experimental Techniques in Ship and Offshore engineering	
MKMO 2013 Computer Methods in Ship and Offshore engineering	
MKMO 2123 Subsea Technology	
MKMO 2223 Mooring and Riser Analysis	
MKMO 2313 Ship Propulsion and Performance	
MKMO 2513 Advanced Marine Design	
MKMO 2833 Marine Transport System	
<i>* Must pass any of 3 courses above, however the available of the course is depended on demand and available of lecturers.</i>	
Master Projects	10
MKMO 1914 Master Project 1	
MKMO 2926 Master Project 2	
Total Credits	40

RECOMMENDED SCHEDULE

	1 st Semester	2 nd Semester	Short Semester	3 rd Semester	4 th Semester	
Core Subject	9 credits* (3 Subjects)	6 credits* (2 Subjects)		3 credits* (1 Subject)		Total Credit = 40
Elective Subject	3 credits* (1 Subject)	3 credits* (1 Subject)		3 credits* (1 Subject)		
University Elective Subject			3 credits* (1 Subject)			
Master Project				4 credits*	6 credits*	
<u>TOTAL</u>	12 credits*	9 credits*	3 credits*	10 credits*	6 credits*	

*subject to change

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 1213 – Dynamics of Marine Structure (*Core Subject*)

This subject equips the students with knowledge of the environment and relating it with performance of the vessel in **seakeeping and manoeuvring**. The first part of the subject gives an introduction to the ocean environment (Theory of regular/irregular waves and wave energy spectrum). The second part covers the seakeeping aspect – By applying the knowledge of dynamics, vessel's motions due to ocean waves can be predicted. The third part covers the aspect of vessel's manoeuvring and directional stability. The final part discusses on the aspect of using devices such as bilge keels and rudders to control vessel's motions.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 1713 –Ship and Offshore Production Technology (*Core Subject*)

This course is aims at providing the students with **the knowledge on how the ship and offshore structure are constructed** in the shipyard and how the **construction process** is managed. It provides the necessary information and early exposure to the students before they engage their career in work place. The course begins with the introduction to world shipbuilding industry, its important and development in Malaysia. It then followed by topics on Ship and Offshore Structure Production process covering the typical production flow chart and activities, Shipyards location, layout and facilities, Material treatment including surface preparation, cutting process, welding process etc. that involve in ship construction process. Finally introduction ship and offshore structure survey, repair and conversion works will be discussed briefly.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 3843 – Maritime Management and Law (*Core Subject*)

This course provides candidates with advanced knowledge on **marine management and law**. The objective is to expose candidates to advanced issues in the marine industry that currently challenge the traditional management principles. Issues will be focussed on four main categories; firstly, general management principles including planning management, organisational management, motivation and leadership management, secondly, project management, thirdly, risk and safety management and fourthly introduction to maritime law. Instigating the capability of exercising critical thinking in problem solving will be the main focus and as such the course will be delivered via case studies each sandwiched between formal lecture and group discussion facilitated by the lecturer. Problem based approach will be the teaching and learning strategy.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2113 – Strength and Vibration of Marine Structures (*Core Subject*)

This course covers to the fundamentals and **calculations of structural plastic analysis, strength design of column and beam-column, strength design of unstiffened and stiffened plate, and analysis of structural vibrations for ship and offshore platform**. The course begins with the basics and marine structural safety concerns, and design process through all phases of calculations: loads, response, and limits state stress. The focus of this course is on the structural design synthesis including design philosophy and procedures; and also the importance of vibration in ship and offshore structural design. The course is presented through classroom lectures, student participation in practical exercises. The course addresses the universally accepted mathematical calculations of unstiffened and stiffened plate response, and analysis on vibrations model.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2813 – Maritime Safety and Risk (*Core Subject*)

This course provides **safety and risk assessment of ship and offshore platform**. Hazard and operability problems and risk assessment are introduced in the beginning; it allows the severity of the risk of an event occurring to be determined. The description on principle of reliability-based design (RBD) and the possible effect of RBD on its own areas that need to be justified based on Formal Safety Assessment (FSA) are then given, including uncertainties in the loading or environment, defects in the materials, inadequacies in design, and deficiencies in construction or maintenance. At the end of this course the student will be able to understand the fundamentals of reliability-based design: deterministic and stochastic variables, understand the difference between deterministic and probabilistic design. For a given load effect and resistance, the student will be able to define and calculate the probability of failure (at least graphically).

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 1413 – Dynamics of Marine Power Plant (*Elective Subject*)

The course is designed for introducing the students to the various aspects of **marine power plant dynamic behaviors**. This includes the different types of power plant characteristics and selection procedures, machinery control systems, balancing and vibration characteristics of the power plant.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 1913 – Experimental Techniques in Ship and Offshore Engineering (*Elective Subject*)

This course equips the students with **theory and practice on experimental techniques in marine technology**. It covers the basic experiment planning which include not only the model experiment but also the **measurement under controlled or uncontrolled environment**. The various how to plan an experiment and what to do with the obtained data will also be covered. The analysis for the experiments with dynamic systems which have the goal to define the dynamic response characteristics of the system for the relevant frequency ranges will be dealt with. Experiment projects will be analysed as part of the teaching tool. The course includes a seminar where students are required to prepare and present papers related to the experiment projects in hydrodynamic coefficient derivatives for ship seakeeping and manoeuvring.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2013 – Computer Methods in Ship and Offshore Engineering *(Elective Subject)*

In this subject, the students are taught the use of **computer programming and other available computer codes in ship and offshore engineering applications**. The first part covers on the introduction to computer programming – **FORTRAN and MATLAB compilers**. The second part covers an overview of ship lines and mathematical representation. The area, centroid and volume are calculated using approximation (numerical) methods. Mathematical methods for ship lines modelling involve polynomial, cubic splines and B-splines. The third part covers the numerical methods for analysis of ship and offshore structures behaviour in regular and irregular waves using linear and nonlinear systems.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2123 – Subsea Technology (*Elective Subject*)

This course presents an overview of the **introduction to subsea technology, subsea production and control system**. Topics to be addressed in this course will include: **subsea components** such as X'trees, wellhead and manifold and template, field equipment, pipelines and flowlines, umbilicals and risers; subsea control and communication and new technology on subsea. This course also provides **advanced subsea pipeline engineering with a focus on structural and mechanical design of pipelines**. Stress based and limits states design for strength and stability is examined. Other pipeline engineering design considerations are reviewed. Principles of geotechnical engineering and pipeline/soil interaction analysis techniques are examined and special topics are examined. Students will develop general skills on the use of common engineering software tools for report writing and communications.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2223 – Mooring and Riser Analysis (*Elective Subject*)

This course provides the **design and installation operations for riser and mooring systems**. Emphasis is made on design of deep water moorings and riser system by the accepted **industry practices and design codes and criteria**. It starts with the types and layout of risers, layout and geometry of mooring and line types. Then the riser and mooring line design cycle is introduced and in this section the students calculate the environmental loads, pretension and static equilibrium, and Vortex Induced Vibration (VIV), and analyse the static and dynamic performances including floaters. The students also solve the dynamic performances of riser/mooring lines using **simulation software** (eg. MOSES, HYDROSTAR, ARIANE and ORCAFLEX) and analyse the fatigue of riser and mooring chains.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2313 – Ship Propulsion and Performance (*Elective Subject*)

This course provides the knowledge on **ship hydrodynamics theory** and practices that enable the students to **perform calculation, analysis, design and evaluation of ship's performance and behaviour in seaway**. The first part of the course provides students with basic knowledge on ship resistance and its component and to predict ship resistance using model experimental results or standard series data; to understand basic propeller action and design propeller using design charts and applying simple theory.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2513 – Advanced Marine Design (*Elective Subject*)

This course equips the students with **knowledge on the development of advance marine vehicles**. The course starts with the philosophy of evolution of maritime transportation from the early days to the present state of the transportation system. Students are then provided with the definition and classification of advance marine vehicles together with the method of quantifying the means of achieving high transport. Students are provided with numerous examples of high transportation case studies that enhance the ability to critically decide the viability of the future transportation requirement. Students will be required to comprehend the future potential of advance marine vehicle and the limitations that systems and technology limits.

MASTER OF SCIENCE (SHIP AND OFFSHORE ENGINEERING)

COURSE DESCRIPTION

MKMO 2833 – Marine Transport System (*Elective Subject*)

Marine transport is one of the important components in the Marine Technology program. Generally, marine transport is one of the main **activities for shipping**. The requirement for marine transport system will naturally support direct and indirectly many other shipping or maritime based related activity such shipbuilding, oil and gas, port operation, logistic and supply chain, etc. In the process of executing these activities, a number of **relevant policies, rules and regulation such as Flag of Convenient, Chartering**, etc to be considered and applied accordingly ensuring the optimum transport undertakings.

Successful Industry-Academic Story

ADI MAIMUN

PROF ADI MAIMUN ABDUL MALIK

HEAD, MARINE HYDRODYNAMICS RESEARCH,
UNIVERSITI TEKNOLOGI MALAYSIA

MALIKAI Project

First Tension Leg Platform in Malaysia

© COPYRIGHT RESERVED

**SCHOOL OF MECHANICAL ENGINEERING
FACULTY OF ENGINEERING
BLOCK E-07
UTM JOHOR BAHRU
81310 SKUDAI, JOHOR
+607-5557061(Office)/+607-5557097(Fax)**

Or

**Head of Program Coordinator
Master of Science (Ship And Offshore Engineering)
Dr Farah Ellyza Hashim
ellyza@mail.fkm.utm.my
*farahellyza@utm.my***

**Slide Presentation and Program Brochure Available in following
Link**

https://www.mtc-utm.my/?page_id=681

