How to Apply

Information on the procedures, regulations and application form can be obtained from the Student Recruitment & Admission Division (SRAD)

www.sps.utm.my /sps/admission.html

Tuition Fees

Student Category	Fees for Per Semester by Programme			
	Master (Taught Course) Local students		Master (Taught Course) International students	
	Full Time (RM)	Part Time (RM)	Full Time (RM)	Part Time (RM)
New Student (First Semester)	3,485.00	2,485.00	7,810.00	5,310.00
Continuing Student	2,935.00	1,935.00	7,260.00	4,760.00
Continuing Student (Semester III)	2,935.00	1,935.00	7,260.00	4,760.00
Continuing Student (Semester IV & beyond)	** (Any extra sem)	1,935.00	** (Any extra sem)	4,760.00
Total Tuition Fees (Normal Duration)	9,355.00	8,290.00	22,330.00	19,590.00

*****Any extra semester will be charged according to University charges.***
Fees for an international applicant (is not include Personal Bond; VISA, Medical Check-up & Accommodation).

Facilities & Labs

- Marine Technology Centre
- Towing Carriage
- Wave Absorber
- Wave Generator
- Ship Model Milling Machine
- Six-component Force Measurement System
- Basin

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UTM UNIVERSITI TEKNOLOGI MALAYSIA | Faculty of Mechanical Engineering

Master of Science

Ship and Offshore *Engineering*

innovative • entrepreneurial • global

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 Duration

For a full-time student, the completion of a master programme typically requires three semesters (1½ years). However, the programme may be completed in a minimum time of 1 year (2 normal and 1 short semesters). The maximum duration allowed for full-time students is 6 normal semesters (or 3 years) while part-time students are given a maximum of 8 normal semesters. The full time student is allowed to take a maximum of 20 credits in a normal semester and 10 credits in a short semester. The part time student is allowed to take a maximum of 12 credits in a normal semester and 6 credits in a short semester.

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 3.0 or equivalent. Students applying for admission with an overall grade point average of less than 3.0 but with relevant professional experiences may however be considered.

Graduation Requirement

Students must obtain a minimum grade of B- (60%) for each course and overall average grade of B (65%) to graduate. Students are also required to complete a minimum of 40 credits (18 credits of the core ship and offshore engineering courses; 9 credits of the elective courses; 10 credits of the master project and 3 credits of the university compulsory course). For the award of Master of Science (Ship and Offshore Engineering), the students should achieve a total minimum of 40 credit hours with minimum CPA of 3.0, including the completion of Master Project.

Programme

Description

Our Master of Science (Ship and Offshore Engineering) programme provides students broad and diverse subjects, which are necessary to enter the ship and offshore engineering industry. Students will acquire knowledge on the design, dynamic and strength analysis of ship and offshore structure, marine propulsion system, offshore production technology, maritime safety and risk and also maritime management law. On top of that,students will learn about the subsea technology and do some analysis on the dynamics of mooring and riser structures.

Programme Structure :

Course	Credit
University Core (1 course only) UHAP 6013 Development & Global Issues UHAW 6023 Science Philosophy & Social Development(or other courses UXXX xxx3)	3
Ship and Offshore Engineering Core 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	18
Electives (9 credits only) 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 MKMO 2003 Special Topic (subjected to faculty approval) **Free Elective** Students are allowed to take a graduate-level course (3 credits) from any other engineering faculty throughout the study duration	9
Master Projects MKMO 1914 Master Project 1 MKMO 2926 Master Project 2	10
Total Credits	40

**Elective courses are offered based on availability of academic staff and facilities*

List of Academic Staff

Ab. Saman bin Abd. Kader
Professor
PhD (Marine Transport), Liverpool,
MSc (Shipping and Maritime Studies), Liverpool, B.(Marine Eng.), Akademik Ilmu Pelayaran Indonesia
Area of Expertise: Marine transport and management, Marine safety and environment, Inland waterways transport and operation

Adi Maimun bin Abdul Malik
Professor
PhD (Marine Technology), Strathclyde
MSc (Marine Technology), Strathclyde
BSc (Hons) (Naval Arch.), Strathclyde
Area of Expertise: Ship dynamics, stability and design

Omar bin Yaakob
Professor
PhD (Marine Tech.), Newcastle
MSc (Marine Tech.), Newcastle
BSc (Hons) (Marine Eng.), Newcastle Cert. Naval Arch
Area of Expertise: Marine environment, Renewable energy

Mohd Zamani bin Ahmad
Associate Professor
PhD (Microwave, Antennas and Propagation), UTM
MSc (Maritime), Wales
BSc (Hons) (Nautical), Southampton
Area of Expertise: Ethnographic factors in fishing boat design, Megafloat design, System modelling

Faizul Amri bin Adnan
Senior Lecturer
PhD (Ship Hydrodynamics), Hiroshima
MEng (Manufacturing), UKM
BEng (Mech. Marine Tech.), UTM
Area of Expertise: Hydrodynamics, Marine Environment, Ship resistance

Jaswar Koto
Senior Lecturer
PhD (Naval Arch. & Marine), Osaka
MSc (Marine), Curtin, Australia
BEng (Marine), ITS, Surabaya
Area of Expertise: Advanced ice-ship, Subsea, Offshore engineering

Koh Kho King
Senior Lecturer
PhD (Mechanical), Hiroshima,
MEng (Mechanical), UTM,
BEng (Mechanical), UTM
Area of Expertise: Resistance, Design, Ocean energy

Yasser Mohamed Ahmed Abdel Razak
Senior Lecturer
PhD (Naval Arch. & Marine Eng.), Alexandria University
MSc (Naval Arch. & Marine Eng.), Alexandria University
BSc (Hons) (Naval Arch. & Marine Eng.), Alexandria University
Area of Expertise: Hydrodynamics, Computational fluid dynamics, Renewable energy

Nik Mohd Ridzuan bin Shaharuddin
Senior Lecturer
PhD (Mechanical Eng.), UTM
BEng (Mech. Marine Tech.), UTM
Area of Expertise: Marine active control, Vortex induced vibration

Kang Hooi Siang
Senior Lecturer
PhD (Ocean Engineering), Texas A&M University
MEng (Mech.), UTM
BEng (Mech.), UTM
Area of Expertise: Wave structure interaction, Smart offshore structure, Hull-riser-mooring coupled dynamics

Nasrudin bin Hj. Ismail
Senior Lecturer
MSc (Marine Eng.), Newcastle
BSc (Hons) (Marine Eng.), Newcastle
Area of Expertise: Marine engineering, Control and instrumentation

Yahya bin Samian
Senior Lecturer
MSc (Ship Prod. Tech.), Strathclyde
BSc (Naval Arch. & Ocean Eng.), Glasgow
Area of Expertise: Ship design, Ship production, Teaching and Learning

Muhammad Akmal bin Azizan
Tutor (on study leave)
MSc (Marine Tech.), UTM
BEng (Mechanical), UTM

Course Description

CORE COURSES

MKMO 1213 – Dynamics of Marine Structures
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.

MKMO 1713 –Ship and Offshore Production Technology
This course aims in 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. The sot side of the production technology will also be covered including Ship and Offshore Structure production system, its important and main aspects. Finally introduction ship and offshore structure survey, repair and conversion works will be discussed briefly.

MKMO 3843 – Maritime Management and Law
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. This course equips the students with theory and practice on maritime law. It covers the basic maritime laws which regulate the traditional shipping practice.

The various international maritime conventions will also be covered. The development of the various facets of the laws and their implementation at international and local levels will be dealt with. Case studies 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 practice of various laws. The course is modular in nature. There will be 3 sub modules for general management, 3 sub modules for project management, 2 sub modules for safety and risk management and 3 modules for maritime law. Each sub module will start with a preview of a one to two pages of case study material, short series of lectures on the underlying principles, detail synthetizing of the case study material, preparation of short report, presentation of report with questions and answer and finally feedback from the lecturer. Each sub module will take approximately 16 hours (2 days) of work in class. Candidates are not expected to spend extra hours off class and such close monitoring of progress in class will be ensured.

MKMO 2113 – Strength and Vibration of Marine Structures
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.

MKMO 2813 – Maritime Safety and Risk
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). Become familiar with "safety margin", "failure surface" and "Cornell safety index"

ELECTIVE COURSES

MKMO 1413 – Dynamics of Marine Power Plant
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.

MKMO 1913 – Experimental Techniques in Ship and Offshore Engineering
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.

MKMO 2013 – Computer Methods in Ship and Offshore Engineering
In this subject, the students are taught the use of computer programing 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.

MKMO 2123 – Subsea Technology
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. Students will develop more specialized skills on the use of engineering software tools for analysis and design.

MKMO 2223 – Mooring and Riser Analysis
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.

MKMO 2313 – Ship Propulsion and Performance
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.

MKMO 2513 – Advanced Marine Design
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.

MKMO 2833 – Marine Transport System
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.