BACHELOR OF NAVAL ARCHITECTURE & OFFSHORE ENGINEERING WITH HONOURS

PROGRAMME SPECIFICATION

The Bachelor of Naval Architecture & Offshore Engineering with Honours is offered on a full-time basis at the UTM Main Campus in Johor Bahru. The duration of study for the programme is subjected to the student's entry qualifications and is between four (4) years to a maximum of six (6) years.

The programme is based on a 2-Semester per academic session. Generally, students are expected to undertake courses equivalent to between fifteen (15) to eighteen (18) credit hours per semester. Assessments are based on coursework, assignments, projects and final examinations given throughout the semester. Description of the programme is provided below.

General Information

1.	**Awarding Institution**		Universiti Teknologi Malaysia
2.	**Teaching Institution**		Universiti Teknologi Malaysia
3.	**Programme Name**		Bachelor of Naval Architecture & Offshore Engineering with Honours
4.	**Final Award**		Bachelor of Naval Architecture & Offshore Engineering with Honours
5.	**Programme Code**		SEMOH
6.	**Professional or Statutory Body of Accreditation**		Engineering Accreditation Council (EAC)
7.	**Language(s) of Instruction**		Bahasa Melayu and English
8.	**Mode of Study (Conventional, distance learning, etc.)**		Conventional
9.	**Mode of Operation (Franchise, self-govern, etc.)**		Self-govern
10.	**Study Scheme (Full Time / Part Time)**		Full Time
11.	**Study Duration**		Minimum : 4 years Maximum : 6 years
Type of Semester		No of Semesters	No of Weeks/Semester
Normal		8	14
Short		1	8
12.	**Entry Requirements**		Matriculation / STPM / Diploma or equivalent

Course Classification

No.	Classification	Credit Hours	Percentage
i.	University Courses		25%
	(a) General	10	
	(b) Language	8	
	(c) Entrepreneurship	2	
	(d) Co-Curriculum	3	
	(e) Mathematics	12	
ii.	Mechanical Core	41	29%
iii.	Programme Core	62	44%
iv.	Programme elective	2	2%
	Total	**140**	**100%**
Classification of courses for engineering programme			
A	Engineering Courses		75%
	(a) Lecture/Project/ Laboratory	94	
	(b) Workshop/Field/Design Studio	0	
	(c) Industrial Training	5	
	(d) Final Year Project	6	
	Total Credit Hours for Part A	**105**	
B	Non-Engineering		25%
	(y) Applied Science/Mathematic/Computer	12	
	(z) Management/Law/Humanities/Ethics/Economy	12	
	(aa) Language	8	
	(bb) Co-Curriculum	3	
	Total Credit Hours for Part B	**35**	
Total credit hours for Part A and B		**140**	**100%**
Total Credit Hours to Graduate		**140 credit hours**	

AWARD REQUIREMENTS

To graduate, students must:

- Attain a total of not less than 140 credit hours with a minimum CGPA of 2.00.
- Has passed all specified courses.
- Has applied for graduation and has been approved by the University.
- Has completed all five (5) Professional Skills Certification (PCS) courses in UTM
- Other condition as specified.

AREAS OF STUDY

Naval Architecture and Offshore Engineering are two important sectors in the maritime industry. The area of studies includes the design and system design, operations, performance and dynamic behaviour of marine vehicles such as ships, and also other marine structures fixed or floating. The curriculum has about forty-five percent (45%) containing basic engineering courses such as Statics, Dynamics, Thermodynamics, Fluid Mechanics, and Mechanics of Materials. Naval architecture and offshore engineering related courses are about forty percent (40%). The courses are introduced as early as in the first semester and more courses are offered towards the end of the study period. The specialised courses for Naval Architecture and Offshore Engineering include:-

(a) Naval Architecture

Naval Architecture is a study which introduces students to basic naval architectural knowledge. It enables students to familiarise themselves with naval architectural terms, ship components and undertakes simple hydrostatics and stability calculations. Tools and techniques which are required in future naval architecture work are introduced here. Students will be able to carry out calculations to determine ship stability in all conditions. The content covers calculation of areas, moments and centroids, transverse stability, longitudinal stability, large angle stability, damage stability, launching.

(b) Marine Hydrodynamics

Basic knowledge of marine hydrodynamics theory and CFD software are introduced. Enhancement of knowledge in Mechanics of Fluids I started with some discussion on motion of Viscous/Real fluid and an Ideal fluid. Further discussion is also given in surface waves and hydrodynamic of slender bodies.

(c) Ship and Offshore Structures

Ship and Offshore Structures concerns with the knowledge on loading and stresses of ship and offshore structure. It begins with the components and functions on ship and offshore structures. The floating hull loading, shear forces and bending moments will then discuss in detail. The important structural strength analysis for ship and offshore structures will be highlighted on bending and buckling afterward.

(d) Ship and Offshore Production Technology

Ship and Offshore Production Technology study is essential as it prepare the student with the basic knowledge and exposure on construction process of ship & offshore structures. This course covers the hardware and software aspects of ship and offshore production technology. It begins with the introduction to ship building industry, its importance and development in world economics and in Malaysia, ship and offshore/production construction process flow chart and activities. Production/construction yards location, layout and facilities. Material treatment including surface preparation, cutting process, welding and painting process which involve in the construction process. It followed by subassembly, block assembly and erection process of offshore structures. Upon completion, launching, transporting and upsetting process will also be discussed. On the soft engineering side, the quality control and production system will also be taught. Apart from normal lecture hours, the

students are expected to carry out class assignment, field surveys or site visits to ship and offshore production yards and technical writing. Therefore, the course is expected to develop and enhance the students' ability to discuss and explain the related knowledge, to work in team effectively, long life learning and communication skills.

(e) Integrated Ship and Offshore Design Project

The course firstly explains the concepts of engineering design and later relates them to the process and procedures in ship and offshore design. Emphasis is made on preliminary design calculations to satisfy owner's requirements and related legislations. The hands-on part will deal with design tasks, including hull form design (manually and computer aided), hydrostatics calculation and General Arrangement.

In terms of design, the students will be given areal design job and working as consultant group to closely replicates the real ship and offshore design practice. Designing ship hull forms and its related general arrangement to serve its functions done previously, this course also continuing the necessary design tasks including Stability Calculation and Assessment, Scantling Calculation and Strength Assessment, and Shell Expansion & material take off. This course emphasis is Handson Design Project works (in group) with continuous monitoring from the lecturer. Apart from providing the necessary technical knowledge and skills the course also aimed at developing the necessary generic skills such as team working, oral and written presentation skills, project management skills etc. The contents and conduct of the design project areas much as possible tailored to the real design practice in industry.

(f) Marine and Offshore Engineering Systems

The course covers the main engineering systems of the ship and offshore structure machinery. This includes the propulsion and auxiliary systems. Selected analysis of the thermodynamic processes of the system, description of the plant main components, operating principles and plant performances will be studied. This includes the marine diesel engine and steam turbine power plant, electric and hydraulic power systems. Other important support system such as air conditioning, fire, condition and Performance monitoring system will also be covered.

(g) Marine Transport Economic

The course focuses on delivering knowledge to students on two aspects of maritime transport and economics. Firstly, is on the basic definitions and process for the efficient operation of global port and shipping operations. Secondly is on the basic definition for the economics of port and shipping operations up to the concepts for appraising investment and financial performance. Additional knowledge is also given to students on the current issues influencing the world maritime scenario. The topics selected are globalization, technology and knowledge while addressing environmental issues.

(h) Marine Management, Environment and Safety

This course aims to prepare students with knowledge on basic principles of management, project management, marine environment and safety. The management part will examine key issues in management and organization, past and present management, strategic management, organizational structure and design, human

resource management, motivating employees and leadership. Project management shall cover network analysis, resources constrained project, crash time and project performance and risk assessment. Main topics covered under environment and safety will be IMO, MARPOL, SOLAS and the like. OSHA1994, Factories and Machinery Act 1967 shall also be mentioned. Safety topics cover hazard identification, risk assessment and control, basic principles of accident prevention and occupational health. At the end of the course, students should be able to describe fundamental aspects of management, integrate knowledge in engineering and management in making business decisions, apply the principles of hazard identification, risk assessment/control, plan, design and implement an effective safety program.

(i) Ship Resistance and Propulsion

This course introduces students to ship hydrodynamics, dimensional analysis, fundamental of ship resistance and its components, fundamental of ship model testing and extrapolation methods and marine propulsors. The course also includes propeller theories, methods of propeller design and the study of cavitation phenomena together with the analysis of propeller-engine matching.

CAREER PROSPECTS

Graduates of this programme are essentially Naval Architects, but with applied knowledge on offshore engineering. They could be registered with the Board of Engineers Malaysia (BEM) under the category of Naval Architect and join the Institute of Engineers Malaysia (IEM).

The Maritime Industry encompasses all forms of maritime activity and can be divided into several segments namely, Shipbuilding & Ship Repair, Offshore Structure and Vessels Fabrication, Ocean & Coastal Shipping Port Services, Marine Professional Services, Maritime Defence and Law Enforcement, Government Authorities & Marine/Maritime Associations, Marine and Inland Fishing, Marine Tourism, Marine Mining, Marine Environment and Marine Products & Services.

There are excellent employment opportunities in all of these segments of the maritime industry.

Naval Architects have a wide range of employment opportunities, not limited to areas such as Ship and Offshore Vessel Design, Construction and Repair, Consultancy, Marketing and Sales, Operations, Regulation, Surveying and Overseeing, Research and Development and in the Education and Training sector.

Naval Architects and Offshore Engineers play a vital role in the delivery of the many complex and challenging projects being developed. This is possible since they have the ability to model and solve a problem, describe and deliver an economical solution and then supervise and manage the work through to completion. The end product needs to be feasible, economical, safe, delivered on time, as well as respectful to the environment. All of these require a special combination of aptitude, vision and commitment.

Each type of work has its own distinctive character and offers opportunities for initiative and imagination in a wide variety of technical and managerial posts as well as opportunities for

foreign travel. The workplace may be a large company, a small group, a consultancy or a government department.

Programme Educational Objectives (PEO)

After having exposed to 3 to 5 years working experience, our graduates should become professionals who demonstrate the following competencies:

Code	Intended Educational Objectives
PEO1	Demonstrate academic and technological excellence professionally and globally, particularly in areas related to naval architecture and offshore engineering practices and contribute innovatively to the nation's wealth creation.
PEO2	Career advancement by achieving higher levels of responsibility, leadership and acquiring professional and advanced academic qualifications.
PEO3	Recognize and practice professional, ethical, environmental and societal responsibilities and value different global and cultural aspects of their work and society.
PEO4	Adapt and communicate effectively and be successful working with multi-disciplinary teams.

Programme Learning Outcomes (PLO)

After having completed the programme, graduates should be able to demonstrate the following competencies:

Code	Intended Learning Outcomes
PLO 1	Ability to acquire and apply fundamental knowledge of mathematics, science and engineering principles to solve complex naval architecture and offshore engineering problems; Keywords: **Engineering Knowledge**
PLO2	Ability to identify, formulate and analyse complex naval architecture and offshore engineering problems; Keywords: **Problem Analysis**
PLO3	Design solutions for complex naval architecture and offshore engineering problems that fulfil health, safety, societal, cultural and environmental needs; Keywords: **Design/Development of Solutions**
PLO4	Investigate complex naval architecture and offshore engineering problems using research-based knowledge and methods to produce conclusive results; Keywords: **Investigation**

PLO5	Use modern engineering and information technology (IT) tools in complex naval architecture and offshore engineering activities, with an understanding of limitations; Keywords: **Modern Tools Usage**
PLO6	Apply professional engineering practice and solutions to complex naval architecture and offshore engineering problems related to societal, health, safety, legal and cultural issues with full responsibility and integrity; Keywords: **The Engineer and Society**
PLO7	Evaluate the sustainability and impact of professional engineering work in the solutions of complex naval architecture and offshore engineering problems in societal and environmental contexts; Keywords: **Environment and Sustainability**
PLO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice; Keywords: **Ethics**
PLO9	Communicate effectively on complex naval architecture and offshore engineering activities both orally and in writing; Keywords: **Communication**
PLO10	Work productively as an individual, and as a member or leader in a team that may involve multi- disciplinary settings; Keywords: **Team Working**
PLO11	Undertake lifelong learning and manage information including conducting literature study; Keywords: **Lifelong Learning**
PLO12	Demonstrate and apply knowledge on finance and management principles and acquire entrepreneurship skill; Keywords: **Project Management, Finance & Entrepreneurship**

MOBILITY PROGRAMME (OUTBOUND)

Universiti Teknologi Malaysia (UTM) is offering five (5) types of mobility programs which allow UTM Student to go abroad and join academic programs in universities, institutions or organizations in all over the world. The opportunities offered are as below:

1. **Study Abroad / Student Exchange**
   Study Abroad/Student Exchange programme is a programme which allow student to spend one or two semesters at universities abroad and take courses in regular semester with credit transfer opportunity.

2. **Research Internship Abroad**
   Research Internship is a program which allow student to join research study or internship under the supervision of an academic staff at universities or industries abroad from all over the world.

3. **Global Outreach Programme (GOP)**
   GOP is a 7 to 14 days academic based program to experience various cultures in other countries. It includes immersion elements such as research & academic activities, social responsibility and cross-cultural activities.

4. **International Invitation Programme**
   Students participate in program organised by international institutions/ organisations with the following themes:
   (i) Seminar, Conference or Paper Presentation
   (ii) Cultural Exhibition and Conference
   (iii) Student Development Activity

5. **Summer School Abroad**
   Summer School program is a program which is designed to provide educational opportunities in 4 to 8 weeks during summer holiday abroad. It is related to environment, local community, heritage and tradition.

Details and appropriate forms and procedures can be reached at **UTM International link: http://www.utm.my/international/outbound-mobility-programs/**

COURSE MENU

YEAR 1 : SEMESTER 1			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMM 1203	Static*	3	
SEM0 1503	Ship Engineering Drawing	3	
SEMM 1911	Experimental Methods	1	
SEMO 1922	Introduction to Naval Architecture and Offshore Engineering	2	
SEEU 1002	Electrical Technology	2	
SSCE 1693	Engineering Mathematics I	3	
UHLB 1112	English Communication Skills	2	
UHIS 1022	Philosophy and Current Issues (for Local Student Only)	2	
UHIS 1022 OR UHMS 1182	Philosophy and Current Issues OR Appreciation of Ethics and Civilisations (for International Students Only)		
Total		**18**	

YEAR 1 : SEMESTER 2			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMM 1013	Programming for Engineers	3	
SEMM 1113	Mechanics of Solids I*	3	SEMM 1203
SEMM 1213	Dynamics*	3	SEMM 1203
SEMO 1332	Naval Architecture I	2	SEMO 1503
SSCE 1793	Differential Equations	3	SSCE 1693
UHMT 1012	Graduate Success Attributes	2	
UHMS 1182	Appreciation of Ethics and Civilisations (for Local Student Only)	2	
UHLM 1012	Malay Language for Communication 2 (for International Students Only)		
Total		**18**	

Subject to changes
*** Core Courses – minimum passing grade is C (50%)**
Notes: L – Lecture, T – Tutorial, P/S – Practical/Studio

YEAR 2 : SEMESTER 1			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMM 2313	Mechanics of Fluids I*	3	SEMM 1203
SEMM 2413	Thermodynamics*	3	
SEMM 2613	Materials Science	3	
SSCE 1993	Engineering Mathematics II	3	SSCE 1693
UHLB 2122	Academic Communication Skills	2	UHLB 1122
UHIT 2302	Thinking of Science & Technology	2	
Total		**16**	

YEAR 2 : SEMESTER 2			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMM 2223	Mechanics of Machines and Vibration*	3	SEMM 1213
SEMO 2123	Ship and Offshore Structures I	3	SEMM 1113
SEMO 2323	Marine Hydrodynamics	3	SEMM 2313
SEMO 2713	Ship & Offshore Production Technology	3	
SEMM 2921	Laboratory I	1	SEMM 1911
SEEU 2012	Electronics	2	SEEU 1002
SSCE 2193	Engineering Statistics	3	
Total		**18**	

Subject to changes
*** Core Courses – minimum passing grade is C (50%)**
Notes: L – Lecture, T – Tutorial, P/S – Practical/Studio

YEAR 3 : SEMESTER 1			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMM 3023	Applied Numerical Methods	3	SEMM 1013, SSCE 1793
SEMM 3931	Laboratory II	1	SEMM 2921
SEMO 3512	Ship and Offshore Design	2	SEMO 1332
SEMO 3333	Naval Architecture II	3	SEMO 1332
SEMO 3353	Ship Resistance and Propulsion	3	
SEMO 3813	Marine Transport and Economics	3	
UKQF 2xx2	Co-Curriculum Service-Learning Elective	2	
Total		**17**	

YEAR 3 : SEMESTER 2			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMO 3033	Computational Methods in Ocean Engineering	3	
SEMM 3242	Instrumentation	2	SEEU 2012**
SEMM 3623	Materials Engineering	3	SEMM 2613
SEMO 3133	Ship and Offshore Structure II	3	SEMO 2123**
SEMO 3523	Integrated Ship & Offshore Design Project I	3	SEMO 3512
UBSS 1032	Introduction to Entrepreneurship	2	
UHLB 3132	Professional Communication Skills	2	UHLB 1112, UHLB 2122
Total		**18**	

SHORT SEMESTER			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMO 3915	Industrial Training		##, SEMO 2123**, SKMM 2223**
Total		**5**	

Subject to changes

**** Minimum grade D- (30%) in the pre-requisite courses**

Obtained minimum of 80 credits

Notes: L – Lecture, T – Tutorial, P/S – Practical/Studio

YEAR 4 : SEMESTER 1			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMO 4233	Dynamics of Marine Vehicles	3	SEMM 2223, SEMO 2323
SEMO 4423	Marine and Offshore Engineering System	3	SEMM 2413
SEMO 4533	Integrated Ship & Offshore Design Project II	3	SEMO 3523
SEMO 4912	Undergraduate Project I	2	SEMM 2223**, SEMO 2123**
SEMO 4262	Risers & Mooring Dynamics	2	
UXXX 2xx2	Generic Skills or Knowledge Expansion Cluster Elective	2	
Total		**15**	

YEAR 4 : SEMESTER 2			
CODE	**COURSE**	**CREDIT**	**PRE-REQUISITE**
SEMM 4902	Engineering Professional Practice	2	Must be 3rd year
SEMO 4924	Undergraduate Project II	4	SEMO 4912
SEMO 4823	Marine Management, Safety and Environment	3	
SEMO 4951	Marine Laboratory	1	
SEMO 4xx2	Marine and Offshore Elective	2	
UHLX 1112	Foreign Language Elective	2	
UKQT 3001	Extra-Curricular Experiential Learning	1	Completed three extracurricular experience programmes
Total		**15**	

Subject to changes

**** Minimum grade D- (30%) in the pre-requisite courses**

Notes: L – Lecture, T – Tutorial, P/S – Practical/Studio

English prerequisite is shown below:

ENGLISH LANGUAGE TESTS	UHLB 1112	UHLB 2122	UHLB 3132
a) MUET : ≥ Band 4 b) IELTS : ≥ Band 5.5 c) TOEFL: ≥ 525 d) TOEFL iBT : ≥ 60 e) CEFR : ≥ B2	Exemption*	Compulsory	Compulsory

* Eligible students are required to apply for UHLB 1112 course credit exemption. The credit exemption form (UTM.E/3.8) is provided at the academic office.

MARINE AND OFFSHORE ELECTIVE COURSES

Choose one (1) from Elective

SEMO 4012 Marine Meteorology and Oceanography

SEMO 4132 Marine Control Engineering

SEMO 4142 Reliability of Ship and Offshore Structures

SEMO 4152 Platform, Pipeline and Sub-Sea Technology

SEMO 4452 Marine Engineering System Project

GRADUATION CHECKLIST

To graduate, students must pass all the stated courses in this checklist. It is the responsibility of the students to ensure that all courses are taken and passed. Students who do not complete any of the course are not allowed to graduate.

NO	COURSE CODE	COURSE NAME	CREDIT EARNED (JKD)	CREDIT COUNTED (JKK)	TICK (/) IF PASSED
MECHANICAL ENGINEERING COURSES					
1	SEMM 1013	Programming for Engineers	3	3	
2	SEMM 1113	Mechanics of Solids I	3	3	
3	SEMM 1203	Statics	3	3	
4	SEMM 1213	Dynamics	3	3	
5	SEMO 1503	Ship Engineering Drawing	3	3	
6	SEMO 1332	Naval Architecture I	2	2	
7	SEMM 1911	Experimental Methods	1	1	
8	SEMM 2223	Mechanics of Machines & Vibration	3	3	
9	SEMM 2313	Mechanics of Fluids I	3	3	
10	SEMM 2413	Thermodynamics	3	3	
11	SEMM 2613	Materials Science	3	3	
12	SEMM 2921	Laboratory I	1	1	
13	SEMM 3023	Applied Numerical Methods	3	3	
14	SEMO 3033	Computational Methods in Ocean Engineering	3	3	
15	SEMM 3242	Instrumentation	2	2	
16	SEMM 3623	Materials Engineering	3	3	
17	SEMM 3931	Laboratory II	1	1	
18	SEMM 4902	Engineering Professional Practice	2	2	
19	SEMO 1922	Introduction to Naval Architecture & Offshore Engineering	2	2	
20	SEMO 2123	Ship & Offshore Structures I	3	3	
21	SEMO 2713	Ship & Offshore Production Technology	3	3	
22	SEMO 2323	Marine Hydrodynamics	3	3	
23	SEMO 3512	Ship & Offshore Design	2	2	
24	SEMO 3333	Naval Architecture II	3	3	
25	SEMO 3353	Ship Resistance & Propulsion	3	3	
26	SEMO 3133	Ship & Offshore Structures II	3	3	
27	SEMO 3523	Integrated Ship & Offshore Design Project 1	3	3	
28	SEMO 3813	Marine Transport & Economics	3	3	
29	SEMO 3915	Industrial Training	5	HL	
30	SEMO 4233	Dynamics of Marine Vehicles	3	3	
31	SEMO 4423	Marine & Offshore Engineering System	3	3	

32	SEMO 4533	Integrated Ship & Offshore Design Project II	3	3	
33	SEMO 4823	Marine Management, Safety & Environment	3	3	
34	SEMO 4912	Undergraduate Project I	2	2	
35	SEMO 4924	Undergraduate Project II	4	4	
36	SEMO 4941	Marine Laboratory	1	1	
37	SEMO 4262	Risers & Mooring Dynamics	2	2	
38	SEMO 4xx2	Marine & Offshore Elective	2	2	
TOTAL CREDIT FOR ENGINEERING COURSES (A)			**101**	**96**	
ELECTRICAL COURSES (School of Electrical Engineering)					
1	SEEU 1002	Electrical Technology	2	2	
2	SEEU 2012	Electronics	2	2	
TOTAL CREDIT FOR ELECTRICAL COURSES (B)			**4**	**4**	
MATHEMATICS COURSES (Faculty of Science)					
1	SSCE 1693	Engineering Mathematics I	3	3	
2	SSCE 1793	Differential Equations	3	3	
3	SSCE 1993	Engineering Mathematics II	3	3	
4	SSCE 2193	Engineering Statistics	3	3	
TOTAL CREDIT FOR MATHEMATICS COURSES (C)			**12**	**12**	
UNIVERSITY GENERAL COURSES					
CLUSTER 1: APPRECIATION OF PHILOSOPHY, VALUE & HISTORY					
1	UHIS 1022	Philosophy and Current Issues (for Local Students Only)	2	2	
	UHIS 1022 OR UHMS 1182	Philosophy and Current Issues OR Appreciation of Ethics and Civilizations (for International Students Only)			
2	UHMS 1182	Appreciation of Ethics and Civilizations (for Local Students)	2	2	
	UHLM 1012	Malay Language 2 (for International Students)			
CLUSTER 2: GENERIC SKILLS					
1	UHMT 1012	Graduate Success Attributes	2	2	
2	UHMT 2012	Leadership	2	2	
3.	UHMS 2022	Critical and Creative Thinking	2	2	
4.	UHMS 2032	The Human side of Knowledge Management	2	2	
5.	UHMS 2042	Development and Global Issues	2	2	
6.	UHMT 2042	Guidance & Counselling	2	2	
7.	UHMT 2062	Psychology of Adjustment	2	2	
8.	UBSS 2072	Fundamentals of Intellectual Property Law	2	2	

9.	UBSS 2082	Law for Entrepreneurs	2	2	
10.	UBSS 2092	Entrepreneurship and Enterprise Development	2	2	
11.	UBSS 2102	Social Entrepreneurship	2	2	
12.	UHMS 2112	Engineering Communication	2	2	
13.	UHMS 2122	Human Communication	2	2	
14.	UHMT 2132	Professional Ethics	2	2	
15.	UMJT 2142	Professional Ethics, Safety and Health (Ningen Ryoku)	2	2	
CLUSTER 3: KNOWLEDGE EXHANCEMENT					
1.	UHIT 2302	Science and Technology Thinking	2	2	
2.	UHIT 1022	Science, Technology and Mankind	2	2	
3.	UHII 2012	Al-Qur'an and Human Civilization	2	2	
4.	UHIT 2032	Life Institutions and Sustainable Development	2	2	
5.	UHIZ 2042	Future Studies	2	2	
6.	UHIT 2052	Family Law	2	2	
7.	UHIZ 2062	World science	2	2	
8.	UHIS 2072	Sustainable Economy	2	2	
9.	UHIS 2082	Practice and Concept of Halal Management	2	2	
10.	UHII 2092	Philosophy of Islamic Art	2	2	
11.	UHII 2102	Islam and Health	2	2	
12.	UHII 2132	Islamic Entrepreneurship	2	2	
13.	UETS 2142	Sustainable Energy	2	2	
CLUSTER 4: CO-CURRICULUM & SERVICE LEARNING					
1	UKQF 2xx2	Co-curriculum & Service-Learning Elective	2	2	
2	UKQT 3001	Extra-Curricular Experiential Learning	1	1	
CLUSTER 5: LANGUAGE SKILLS					
1	UHLB 1112	English Communication Skills	2	2	
2	UHLB 2122	Academic Communication Skills	2	2	
3	UHLB 3132	Professional Communication Skills	2	2	
4	UHLB 1032	Introductory Academic English	2	2	
5	UHLB 1042	Intermediate Academic English	2	2	
6	UHLA 1112	Arabic Language	2	2	
7	UHLJ 1112	Japanese Language 1	2	2	
8	UHLC 1112	Mandarin Language I	2	2	
9	UHLF 1112	French Language	2	2	
10	UHLN 1112	Persian Language	2	2	
11	UHLJ 1122	Japanese Language for Communication I	2	2	
12	UHLM 1112	Malay Language for Communication	2	2	
CLUSTER 6: ENTREPRENEURSHIP					
1	UBSS 1032	Introduction to Entrepreneurship	2	2	

TOTAL CREDIT FOR UNIVERSITY GENERAL COURSES (D)	**23**	**23**	
TOTAL CREDIT TO GRADUATE (A + B + C + D)	**140**	**135**	
Note: # Choose one elective either from Cluster 2 (Generic Skills) or Cluster 3 (Knowledge Expansion) for UxxX 2xx2			

OTHER COMPULSORY COURSES – PROFESSIONAL SKILLS CERTIFICATION (PCS)

- **Students are required to enrol and pass FIVE (5) PCS courses, in order to be eligible to graduate**
- **Please refer to page FE 8 in UG Academic Handbook, for more information about PCS courses.**

Compulsory PCS Courses (Enrol all 4 courses)			
1	GSPX XXXX	Design Thinking for Entrepreneur	
2	GSPX XXXX	Talent and Competency Management	
3	GSPX XXXX	Faculty Engineering Safety Pass (FESP) *Module 1 – Compulsory for SKM, SKT and SKE students* *Module 2 – Compulsory for SKA, SC, SKBSK students*	
4	GSPX XXXX	English Communication Skills for Graduating Students (ECS)	
Elective PCS Courses (Choose 1 only)			
1	GSPX XXXX	Data Analytic for Organization	
2	GSPX XXXX	Writing	
3	GSPX XXXX	Construction Measurement (Mechanical & Electrical Works)	
4	GSPX XXXX	Professional Ethics and Integrity	
5	GSPX XXXX	More elective courses to be added in future	

COURSE SYNOPSIS

CORE MECHANICAL COURSES

SEMM 1013 Programming for Engineers

This course formally introduces the concept of computers, algorithms, programming languages, pseudo-code, and design of programs for solution to computational engineering problems. The two programming languages introduced in this course are C and MATLAB. Topics covered in this course include data types, constants, variables, arithmetic operations, assignment statement, looping, formatted I/O, functions, arrays, matrix operations, data structures, plotting and model building.

SEMM 1113 Mechanics of Solids I

The course provides students with the knowledge to determine the strength and stiffness of engineering structures being used. The structures that will be used in this course are bars, pins, bolts, shafts and beams and the types of applied loadings are axial forces, deformations due to the change in temperature, torsional loads, transverse loads and combination of these loads. At the end of the course, students should be able to determine the mechanical properties of the materials with respect to their strength and stiffness. Students should be able to calculate stresses, strains and deformations in structures due to various types of loading conditions. In addition, they should be able to solve problems related to statically determinate and indeterminate structures.

SEMM 1203 Statics

This course introduces students to the part of mechanic which is a pre-requisite for most engineering courses including SEMM 1213, SEMM 2313 and SEMM 1113. The course enables student to acquire the essential basic knowledge of resultant and equilibrium of forces. It will examine key elements in producing free body diagrams for particles and rigid bodies, as essential first step in solving applied mechanics problems. Exposure to the concept of moment and equilibrium equations with reference of Newton's Law enhances the relevance of friction, trusses, frames and machines applications. Students are also introduced to the concept of distributed forces, which include centroid and centre of gravity and the generated surface area and volume of revolution. Hence, students will be able to demonstrate and apply the knowledge in continuing subjects which requires the analytical skills developed in this subject.

SEMM 1213 Dynamics

The course is an extension to SEMM 1203, which is the pre-requisite to this course. It introduces students to the part of mechanics which considers the action of forces in producing motion. This course provides an exposure to students on the theory of the kinetics and kinematics of particles and rigid bodies. The concepts of energy, work, momentum and impulse are also introduced. At the end of the course students should be able to apply the principles to study and analyse the behaviour and responses of dynamical systems. They should also be able to solve the dynamic problems related to the determination of forces energy and power to move a body.

SEMM 1911 Experimental Methods

This course is conducted via lectures and experimental case study data. Students are exposed to the experimental method theory for the initial weeks and then followed by case study data. The lecture contents shall cover the fundamental of experimental method and the basic principles in measurements, instrumentation and analysis of results. It shall focus on the design of mechanical experiments, selection of sensors and transducers, estimation of errors and display of results. It shall also cover the analysis of results and how to prepare proper report writing. Student comprehension will be tested in two written tests. Based on the given experimental data, students are also expected to conduct statistical analysis of results and write the experimental outcome in a report.

SEMM 2223 Mechanics of Machines and Vibration

The course requires SEMM 1213 as the pre-requisite. It is designed to expose students to the application of concepts in mechanics (statics and dynamics) to solve real world mechanical engineering problems pertaining to various machines which include belt and pulley systems, gears, flywheels, governors and gyroscopes. Students will also be exposed to the methods of balancing rotating masses and parts of a combustion engine. The concept of vibration with respect to one-degree-freedom is also studied. At the end of the course, the students should be able to solve problems related to various mechanical systems. In addition, they should be able to evaluate analytically the parameters of components of various machines under study.

SEMM 2313 Mechanics of Fluids I

The principle aim of this course is to provide students with an understanding of the properties

of fluids and to introduce fundamental laws and description of fluid behaviour and flow. It will emphasize on the concept of pressure, hydrostatic pressure equation and its application in the measurement of pressure, static force due to immersed surfaces, floatation and buoyancy analysis. Dynamic flow analysis inclusive of technique in solving flow problems is introduce specially to solve flow measurement, mass or volumetric flow rate, momentum in flow and loss in pipe network. Lastly, some basic dimensional analysis and similarities will be introduced. At the end of the course, the student should be able to demonstrate an ability to analyze whether statically, dynamically or kinematically problems related directly to fluids.

SEMM 2413 Thermodynamics

Thermodynamics is a basic science that deals with energy. This course introduces students to the basic principles of thermodynamics. It will discuss basic concepts and introduces the various forms of energy and energy transfer as well as properties of pure substances. A general relation for the conservation of energy principle expressed in the First Law of Thermodynamics will be developed and applied to closed systems and extended to open systems. The second law of thermodynamics will be introduced and applied to cycles, cyclic devices and processes.

SEMM 2613 Materials Science

This course introduces students to the fundamentals of materials science and engineering with emphasis on atomic bonding, crystal structures and defects in metals. It will introduce students to the various classes of materials including metals, ceramics, polymers and composites and their fundamental structures. The course will also provide basic diffusion mechanisms, metal solidification phase diagrams and heat treatment processes. At the end of the course, students should be able to apply the knowledge of atomic bonding and crystal structures to predict the physical and mechanical behaviour of materials and use the principles of phase diagrams and heat treatments to the design of materials and their properties.

SEMM 2921 Laboratory I

This course is introduced in the second year of the Mechanical Engineering programme involving two hours per week session and experimental based courses. It consists of six laboratories; Strengths of Materials Laboratory, Materials Science Laboratory, Mechanics of Machines Laboratory, Electrical Laboratory and Fluid Laboratory. Students will be grouped into 5 to 6 people for each experiment. It is based on the theory that have been learned in the particular courses at the same semester. In general, every student has to carry out a total of twelve experiments. At the end of the session, students have to submit a report for each experiment and will be evaluated based on this report.

SEMM 3023 Applied Numerical Methods

This course formally introduces the steps involved in engineering analysis (mathematical modelling, solving the governing equation, and interpretation of the results). Examples of case studies in applied mechanics, strength of materials, thermal science, and fluid mechanics are presented. Methods for solving the nonlinear equations, simultaneous linear algebraic equations, eigenvalue problem, interpolation, numerical differentiation, numerical integration, initial value problems, boundary value problem and partial differential equation are introduced.

SEMM 3242 Instrumentation
The course shall cover the essential and basic theory of instrumentation for undergraduate. It shall cover the following: fundamentals and components of instrumentation system, characteristics of instrumentation system, signal conditioning and application of sensors in measurements.

SEMM 3623 Materials Engineering
This course is designed to introduce students to the concept of fracture mechanics and how engineering materials respond to mechanical loads. The failure behaviour of engineering materials will cover fracture, fatigue, creep, wear and corrosion. The course will also provide students with knowledge of how to conduct failure analysis and determine the root cause of failure under different mechanical loading. The mechanical behaviour of polymeric materials, ceramics and composites will also be covered examples of case studies as well of selecting engineering materials for specific product designs.

SEMM 3931 Laboratory II
This course is introduced in the third year of Mechanical Engineering programme involving two hours per week and experimental based courses. It consists of six laboratories; Strength of Materials Laboratory, Thermodynamics Laboratory, Materials Science Laboratory, Mechanics of Machines Laboratory, Electrical Laboratory and Fluids Laboratory. Students will be grouped into 5 to 6 for each experiment. It is based on the theory learned in the particular courses at the same semester. In general, every student has to carry out a total of twelve experiments. At the end of the session, students have to submit a report for each experiment and will be evaluated based on this report.

SEMM 4902 Engineering Professional Practice
This course introduces students to engineering ethics and an engineer's responsibilities towards safety, health and welfare of the public. It emphasizes on the engineer as a professional man, engineers & society, code of ethics and professional conduct, standards, laws and regulations pertaining to professional engineering practice. The course will also introduce students to organize, in a group, a community service activity in a planned and structured manner. At the end of the course, students should be able to demonstrate and apply engineering professional ethics in their career as an engineer.

PROGRAMME CORE COURSE

SEMO 1503 Ship Engineering Drawing
This course introduces students to the basic of ships and engineering drawing knowledge. It enables students to apply their skills and knowledge of engineering drawing to understand any design via geometric drawing, orthographic projection, isometric and production drawing. Meanwhile, in ship drawing parts, the student will be able to interpret a hull formation through lines plan drawing which consists of body, half breadth and sheer plan projection. Basic terminologies which related to naval architecture and ship drawing will be highlighted in this course.

SEMO 1332 Naval Architecture I
In this course, students will continue to learn basic naval architecture knowledge. For this

subject, students are exposed on how to use the ship particulars and lines plan data in calculating the hydrostatic particulars of a ship. Students are introduced to the methods of hydrostatics and stability calculations. Students are then introduced to design concept as they are required to use their naval architecture knowledge to design an object for floating structure design competition. The subject contents also include the introduction to ship general arrangement. The course includes hands-on individual and group projects

SEMO 1922 Introduction to Naval Architecture and Offshore Engineering
The course comprises two parts intended to introduce students to the field of naval architecture and offshore engineering. The first part raises the students' awareness on the importance and necessity in developing systematic approach for solving naval architecture and offshore engineering problems. It introduces the importance of some generic skills to naval architects and offshore engineers. It also provides students an overview of the different fields within naval architecture and offshore engineering and a description of the naval architects and offshore engineer's work and professional responsibilities. The second part aims to expose students to the hands-on nature of basic engineering workshop skills.

SEMO 2123 Ship and Offshore Structure I
This course is concerned with the knowledge on loading and stresses of ship and offshore structure. It begins with the components and functions on ship and offshore structures. The floating hull loading, shear forces and bending moments are then in detail discussed. The important structural strength analysis for ship and offshore structures will be highlighted on bending and buckling afterward.

SEMO 2713 Ship & Offshore Production Technology
This course is essential as it prepare the student with the basic knowledge and exposure on construction process of ship & offshore structures. This course covers the hardware and software aspects of ship and offshore production technology. It begins with the introduction to shipbuilding industry, its importance and development in world economics and in Malaysia. Ship and offshore /production construction process flow chart and activities. Production/construction yards location, layout and facilities. Material treatment including surface preparation, cutting process, welding, painting process etc. that involve in the construction process. It followed by sub assembly, block assembly and erection process of offshore structures. Upon completion, Launching, transporting and upsetting process will also be discussed. On the soft engineering side, the quality control and production system will also be taught. Apart from normal lecture hours, the student is expected to carry out class assignment, field survey or site visits to ship and offshore production yards and technical writing. Therefore, the course is expected to develop and enhance the student ability to discuss and explain the related knowledge, to work in team effectively, long life learning and communication skills.

SEMO 2343 Marine Hydrodynamics
This course starts with enhance the knowledge in fluid mechanic with discussion on the motion of Real fluid and Ideal fluid. Basic knowledge of marine hydrodynamics theory and general concept of numerical approach in simulate the flow around floating body are introduced in this course. Further discussions are also given in surface waves and various hydrodynamic problems. The hydrodynamic coefficients such as added mass coefficient, damping coefficient

and wave loading are defined. Brief discussion is also given on the motion of floating body in regular wave by related to the hydrodynamic coefficients of the floating body.

SEMO 3133 Ship and Offshore Structure II

This course is divided into three main areas, namely ship/platform topside vibration, finite element methods and underwater structural failure. In the vibration it starts with introduction to the structural vibration, free vibration and forced vibration. It is then followed by the vibration calculation in ships and platform topside structure. Method of determining vibration characteristics and reducing vibration are given for design practices. FEM covers the analysis of statically indeterminate structure by the direct stiffness method of truss, beam and plane frames. The students are also required to carry out building frame project using FEM software. In the underwater structural failure, it reviews the various modes of structural failure and highlights the importance of fracture induced failure and contrasts it with the limited coverage given to fracture mechanics in underwater. This section will discuss some examples of well-known failures/accidents attributed to cracking. Then, using a simple example we shall compare the failure load predicted from linear elastic fracture mechanics with the one predicted by classical strength of material. The ability to learn independently, working in team and interpret the results objectively will also be emphasized in this course.

SEMO 3033 Computational Methods in Ocean Engineering

This course is designed to enhance the students' computational knowledge in simulating fluid flow and strength of floating structure. In the first half semester, the fundamental knowledge on computational fluid dynamic will be introduced to students. The course will enhance the basic knowledge that has been developed in the Marine Hydrodynamics and expose the students in analysing hydrodynamically the flow field. It will emphasize on the analysis and the importance of boundary layer, ideal and compressible flow in a practical engineering application. The course will also provide the knowledge on analysis of flow through marine vehicle and structure. In the second half semester, the course will be focused in the computational solution to analysis the strength of floating structure. It start with discuss the external loading to the floating structure such as the effect of flow and wave to the stress on the floating structure. After that, the course gives students an exposure to the theoretical basis of the finite element method and its implementation principles. The students will be applied the finite element method to develop the governing equation and solve the equation for the giving simple engineering problem. Besides, this part of the course also introduces the use of general-purpose finite element software for solving real-life engineering problems. At the end of the course, students should be able to demonstrate and apply the theory to solve problem related to marine hydrodynamics.

SEMO 3333 Naval Architecture II

This course introduces students to further naval architectural knowledge. It enables students to familarise themselves with naval architectural terms ship components and undertakes hydrostatics and stability calculations. Students will be able to carry out calculations to determine ship stability in all conditions. The content covers calculation of areas, moments and centroids, transverse stability, longitudinal stability, large angle stability, damage stability and launching.

SEMO 3512 Ship and Offshore Design

This course introduces the students to Ship and Offshore Design. It starts with the definition of design and spiral nature of ship design process. Four different stages of ship design will be discussed briefly but focusing more on basic ship design covering conceptual design and some of preliminary design stage. The contents of the course mainly cover the theory and governing principles used in basic ship design starting from understanding mission and owners requirement, followed by preliminary estimation of main dimensions, hull form properties and generation process, preliminary calculation of hydrostatics and stability and preliminary general arrangement of the ship. Some of the statutory requirements in design will also be discussed and finally method of estimating first cost of the ship will be introduced. Apart from the theoretical background, the student will also require carrying out hands on project (in group) to determine the main dimension and conceptual sketch of general arrangement of a ship based on the given design/owners requirements. This will provide them with the initial exposure and experience of applying the knowledge learned in theory to solve the real problem given.

SEMO 3523 Integrated Ship & Offshore Design Project I

Integrated Ship and Offshore Design Project consists of two Parts run in two consecutive semesters (6 & 7 Sem). This course is the first parts of the IDP that requiring the students to carry out several basic ship design tasks. It covers the Hull form development of the ship based on the design requirements and main dimensions of the ship, General Arrangement design & Capacity calculation and Hydrostatics calculation and Stability Assessment. The result of the design works of this course will be used for following design tasks in the following semesters. The students working in group of three are expected to propose the ships and its main systems that able to deliver the intended design requirements (problem). The design tasks and the quality of the solution should reflect the real design works in industry. In carrying out the design task effectively, the students are expected to apply and integrate the knowledge learnt in the core courses and acquiring new knowledge on their own in order to solve the design problem correctly. Hence the PoPBL (Project Oriented Problem Based Learning) approach is adopted in this course. Apart from technical knowledge and design skills, the students will also be exposed to several generic skills such as team working and leadership skills, communication skills, project management.

SEMO 3353 Ship Resistance & Propulsion

This course introduces students to ship hydrodynamics, dimensional analysis, fundamentals of ship resistance, ship resistance and its components and methods of determining ship total resistance. The course then introduces the fundamentals of ship model testing and extrapolation methods to full scale ships. The course discusses various marine propulsors and specifically the marine propeller. The course also includes the description of propeller geometrical features and its effect on propeller performance. Propeller theories, methods of propeller design and the study of cavitation phenomena together with the analysis of propeller-engine matching also discussed

SEMO 3813 Marine Transport & Economic

This course focuses on delivering knowledge to students on two aspects of maritime transport and economics. Firstly, is on the basic definitions and process for the efficient operation of global port and shipping operations. Secondly is on the basic definition for the economics of

port and shipping operations up to the concepts for appraising investment and financial performance. Additional knowledge is also given to students on the current issues influencing the world maritime scenario. The topics selected are globalization, technology and knowledge while addressing environmental issues.

SEMO 3915 Industrial Training

Industrial training exposes students to the real work setting in various industries for 12 weeks. The students are placed in industries that best suit their area of studies. It is an experiential learning which requires the students to learn the process and able to apply their knowledge acquired in class into actual industrial setting. The knowledge acquire during practical training may be used later in final year class as well as to equip them with sufficient knowledge for job interviews.

SEMO 4233 Dynamics of Marine Vehicles

Marine vehicles and floating structures are built for transportation and also to perform various marine activities such as fishing and offshore drilling. This course provides the knowledge of the characteristics of vessels/structures and the effect of the environment on their behaviour. The course begins with the introduction to effects of waves on vessels and structures. Since ocean waves are complex in nature, by incorporating linear wave theory, statistical methods can be adopted to study the irregular behaviour of waves and relate to vessels/structures motions characteristics. Some of the topics include; Introduction to seakeeping and solving seakeeping in waves using strip theory. Introduction to manoeuvrability of vessels that are motions in the horizontal plane so that they can proceed on a straight path, turn or take other avoiding actions in calm water as well as in waves, wind and current. This course emphasises on the student's ability to identify and solve the behaviour marine vehicles/structures problems by carrying the necessary calculation and analysis.

SEMO 4423 Marine and Offshore Engineering System

The course covers the main engineering systems of the ship and offshore structure machinery. This includes the propulsion and auxiliary systems. Selected analyses of the thermodynamic processes of the system, description of the plant main components, operating principle and performances will be studied. This includes the marine diesel engine and steam turbine power plant, electric, drilling and hydraulic power system. Other important support system such as air conditioning, fire, condition and performance monitoring system will also be covered.

SEMO 4533 Integrated Ship and Offshore Design II

This is the second part of Integrated Ship & Offshore Design Project, continuation from the first part SEMO 3513. The students working in the same group as in part I are expected to continue the ship design tasks by performing structural design and strength assessment and addressing the sustainability aspect of the design in order to complete most of the tasks in preliminary design process. The design work continues with the Offshore Structures design which could be chosen between Semi-Submersible, TLP, FPSO etc. depending on the availability of data. The design task focuses on structures configuration, Hydrostatics Calculation, Stability Assessment based on MODU, Seakeeping and Mooring Analysis and Structural Strength Assessment of the selected offshore structures. The design tasks and the quality of the solution should reflect the real design works in industry. In carrying out the design task effectively, the students are expected to apply and integrate the knowledge learnt

in the core courses and acquiring new knowledge on their own in order to solve the design problem correctly. Hence the PoPBL (Project Oriented Problem Based Learning) approach is adopted in this course. Apart from technical knowledge and design skills, the students will also be exposed to several generic skills such as team working and leadership skills, communication skills and project management.

SEMO 4262 Risers & Mooring Dynamics

This course provides the design and installation operations of 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 analyze the static and dynamic performances including floater. The students also solve the dynamic performances of riser/mooring lines using simulation software (e.g. MOSES) and analyze the fatigue of riser and mooring chains.

SEMO 4823 Engineering Management Environment & Safety

This course aims to prepare students with knowledge on basic principles of management, project management, marine environment and safety. The management part will examine key issues in management and organization, past management and today, strategic management, organizational structure and design, human resource management, motivating employees and leadership. Project management shall cover network analysis, resources constrained project, crash time and project performance and risk assessment. Main topics covered under environment and safety will be IMO, MARPOL, SOLAS and the like. OSHA 1994, Factories and Machinery Act 1967 shall also be mentioned. Safety topics cover hazard identification, risk assessment and control, basic principles of accident prevention and occupational health. At the end of the course, students should be able to describe fundamental aspects of management, integrate knowledge in engineering and management in making business decisions, apply the principles of hazard identification, risk assessment/ control, plan, design and implement an effective safety program.

SEMO 4912 Undergraduate Project I

This course introduces the final year students on how to do academic research on theirnown by applying knowledge and skills they acquired from other courses. Given a topic on a project student have to identify a problem, gather relevant information to the problem and propose solutions to problems. In this course, students have to do some literature surveys in order to understand the nature of the problem and investigate work done by other researchers in line with their work. The students are also required to propose a methodology on how to solve the problems. By the end of this course, the students are expected to submit and present their research proposal to be assessed by their supervisors and panel of assessors.

SEMO 4924 Undergraduate Project II

This course is the continuation of Undergraduate Project (UGP) I. It enhances the students' knowledge and ability to identify and solve problems through academic research. It will provide an exercise for the student in carrying out research with minimum supervision and the ability to plan and manage their work effectively. This course will also develop the students' capability

to present, discuss and analyze results of the research clearly, effectively and confidently in both oral presentation and in dissertation.

SEMO 4951 Marine Laboratory
This course is designed to enable the students to apply knowledge of seakeeping & motions in waves, manoeuvring, offshore structure tests in the laboratory works. The students need to seek information and prepare marine model experiments protocol and procedure. This course will train the students to prepare the experimental set up and conduct the marine model experiments. They are instructed to analyse the experimental result and deduce the appropriate conclusion. The students need to adopt team work to solve seakeeping & motions, manoeuvring, and self-propulsion tests. This course also develops the students' capability to present, discuss and analyse experimental results clearly, effectively and confidently in the oral presentations as well as in the written laboratory reports.

ELECTIVE COURSES:

Elective courses are offered to provide a wider area of study. Students can choose the courses according to their interest.

SEMO 4012 Marine Meteorology and Oceanography
This course gives an introduction to the courses of oceanography and marine meteorology. It explains the fluid physical characteristics and movement on the earth surface. As such, the student will have a clear understanding of the weather which results from the interaction between the atmosphere and the sea surface.

SEMO 4132 Marine Control Engineering
The course encompasses control engineering analysis and the vessel's auxiliary systems. This includes marine control engineering systems, hydraulic and electrical system. The students are expected to solve control engineering problems, analyse the performance and operation of marine control systems

SEMO 4142 Reliability of Ship and Offshore Structures
This course provides reliability of ship and offshore structure as the complement of the failure probability for a rational measure of safety in structural design. The course applies the reliability method which deals with the uncertain nature of loads, resistance, etc. and leads to assessment of the reliability. The reliability method is based on analysis models for the structure in conjunction with available information about loads and resistances and their associated uncertainties. These are introduced to the analysis models that are usually imperfect, and the information about loads and resistances is usually incomplete. At the end of the course, students should be able to calculate the reliability as assessed by reliability method that is generally not a purely physical property of the structure but rather a nominal measure of safety of the structure given a certain analysis model and a certain amount and quality of information.

SEMO 4152 Platform Pipeline and Sub-Sea-Technology
This course provides the concepts of offshore platform, submarine pipeline and subsea-technology, basic calculation on strength and fatigue, safety on fatigue life, reliability

assessment, design issues, fabrication, installation and operations of offshore platform, submarine pipelines and risers, and also understanding of the equipment used in subsea developments.

SEMO 4452 Marine Engineering System Project

Marine Engineering System Project is designed for final year students to perform marine systems design. Students are required to specifically design a typical marine engineering system for a chosen ship or offshore vehicles. Students are then required to integrate these systems together to form a workable compromise and fulfil the vessel's intended function. The students are expected to understand the design processes, operations and selection of the auxiliary systems. During the course of the subject students are required to have numerous discussions and presentations to complete the design. Implementation of this course is via group project.