DIPLOMA IN MARINE & OFFSHORE TECHNOLOGY

Fascinated by ships and how they work? Set sail on your maritime journey when you join our Diploma in Marine & Offshore Technology (MOT). We will train you in naval architecture and offshore technology, which are among the most sought-after specialist skills in Singapore's maritime industry.

With MOT, you will learn to design and build your own ship models, and test them in Singapore's only towing tank located in our campus. Our strong emphasis on Integrated Real-world Projects will give you an edge in creating innovative solutions for using clean energy, developing new materials and processes, as well as designing and building marine vessels and offshore structures.

Thanks to MOT's strong ties with key industry players, such as the Association of Singapore Marine Industries (ASMI), Keppel Offshore & Marine and SembCorp Marine, you get to go on frequent study trips to gain industry exposure and receive in-depth training that will give you a head start in your career!

In the first two years, you will be grounded with strong fundamentals of engineering, together with naval architecture, marine engineering and offshore design technology. Enhanced internships have also been rolled out for MOT students. In your final year, you will intern at a host company in the marine and offshore industry for six months and apply the skills learnt at the workplace.

YEAR 1 COURSE MODULES

LEVEL 1.1

Electrical Engineering Fundamentals
This module provides a foundation in electricity covering basic concepts of electrical circuits and the methods used to analyse them. The module emphasises the understanding of the basic electrical circuit laws (Ohm's Law, Kirchhoff's Voltage and Current Laws) and network theorems, and their application to electrical network analysis. Topics covered include fundamentals of electricity, network theorems, capacitance, electromagnetic induction and inductance.

Engineering Mathematics 1
This module is designed to provide students with the fundamental skills in mathematics required to solve basic engineering problems. Topics are introduced in an order that is intended to keep abreast of the application requirements in engineering modules. The emphasis in each topic is on simple applications and problem solving. Topics include algebra, trigonometry, logarithms, plane analytic geometry, matrices and complex numbers. Throughout the module, there is appropriate use of a Computer Algebra System.

Integrated Real-world Project 1
This module aims to integrate the knowledge learnt in the semester and apply to a real-world project and further enhanced through relevant contextualisation. Students will work in teams and undertake the project development underpinned by the design thinking approach. On completion of the module, students will be able to apply the skills and develop confidence in tackling projects. Data analytics will be introduced using case-based approach and applied in the integrated real-world project.

Mechanical Engineering Fundamentals
This module introduces students to the study of external forces in two dimensions and their effect on particles and rigid bodies that are at rest. Students learn the skills to analyse the forces acting on the bodies by drawing free-body diagrams and applying the conditions of equilibrium. Topics include forces and resultants, moments and couples, equilibrium and the concepts of plane friction. This module also aims to equip students with the skills to analyse problems of rigid bodies in motion. Only linear motion in two dimensions will be covered. Topics include kinematics and kinetics of linear motion.

Programming
This practice-oriented module equips students with basic knowledge and skills in computer programming using C language. The main topics include basic computer programming concepts, fundamentals of C programming including branching, loops, and functions.

LEVEL 1.2

Electrical & Electronic Technology
The aim of this module is to introduce the fundamental concepts of digital electronic devices and circuits. It intends to deepen the electrical fundamentals learnt in the first semester. Topics include AC circuit theory and transformer fundamentals, number systems, Boolean algebra, combinational logic design, applications of latches, flip-flops, counters and registers.

Engineering Mathematics 2
This module is designed to provide students with the fundamental skills in mathematics required to solve basic engineering problems. Topics are introduced in an order that is intended to keep abreast of the application requirements in engineering modules. The emphasis in each topic is on simple applications and problem solving. Throughout the module, there is appropriate use of a Computer Algebra System. Topics include trigonometry, differentiation and simple integration with applications.

Integrated Real-world Project 2
This module aims to integrate the knowledge learnt in the semester and apply to a real-world project and understand the relevance and application of the modules learnt. Students will work in teams and undertake the project development underpinned by the design thinking approach. On completion of the module, students will be able to apply the skills and develop confidence in tackling projects at the higher levels.

Materials & Manufacturing Technology
This module introduces students to properties of common engineering materials with emphasis on mechanical testing methods, heat-treatment, international standard specifications, and selection and applications of such materials. Topics include classification of materials, mechanical testing, alloying, steels, non-ferrous alloys, plastics, ceramics and composites. For manufacturing technology, students will acquire the basic knowledge and skills of manufacturing processes, including drilling, turning, milling, grinding, non-conventional machining, welding and assembly.

Thermofluids
Students will learn the basic laws governing the behaviour of fluids under the influence of energy transfer. Topics include systems concept, temperature and pressure, fluid statics, fluid in motion, continuity equation, laminar and turbulent flows, ideal incompressible flow, Bernoulli's equation, flow measurement and Pitot tube, external flow and applications of thermofluid's principles in simple engineering systems.

YEAR 1 COURSE CURRICULUM

Module Name	Credit Units
Level 1.1 (20 hours per week)	
Electrical Engineering Fundamentals	3
Engineering Mathematics 1	4
English Language Express*	NA
Innovation Made Possible^	3
Integrated Real-world Project 1	4
Mechanical Engineering Fundamentals	3
Programming	3
Level 1.2 (21 hours per week)	
Communication Essentials^	3
Electrical & Electronics Technology	3
Engineering Mathematics 2	4
Health & Wellness^	1
Integrated Real-world Project 2	4
Materials & Manufacturing Technology	3
Thermofluids	3

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is

* This module is only offered to students who are weaker in the English Language.

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.

YEAR 2 COURSE MODULES

LEVELS 2.1

Integrated Real-world Project 3
This module provides students with real world design thinking and problem solving skills and knowledge. Students will work in group to come out problem statement (mission requirement) and apply the knowledge learnt in the semester to design and make a ship model by using software. Project competition will be carried out to assess the ship's performance.

Marine Design Drafting
The module aims to provide students with fundamental training in the principles and practices of the international graphic language for engineering that is based on the International Standard Organisation (ISO) and the Singapore Standards (SS) guidelines. The basic principles of ship construction will be introduced. Various teaching and learning methodology will be applied in creating design and drafting on marine design. Students will learn common engineering drafting tool AutoCAD to produce typical design drawings.

Marine & Offshore Technology
This module provides students with a basic understanding of the current concepts of marine and offshore technology. These include fundamentals of types and features of ship and offshore structure. Knowledge of offshore drilling, working principles of topside production modules, field layout, subsea modules and LNG technology and production chain will be introduced.

Naval Architecture 1
This module introduces the world of marine & offshore technology and aims to provide students with the basic principles of marine hydrostatics, which include intact stability, trim and damage stability. Principles and analysis of centroids on areas, volumes and mass for various types of floating platforms and ships would be covered to enable the learning of marine hydrostatics.

Strength of Materials
This module aims to provide students with the foundational knowledge of strength of materials with an emphasis on applications and problem solving. Topics include simple stresses and strains, torsion in shaft, shear force and bending moment diagrams, stresses in beams, combined stresses and experimental stress analysis.

LEVELS 2.2

Integrated Real-world Project 4
Continued from Integrated Real-world Project 3, this module requires students to apply the production and Marine CAD knowledge learnt in this semester to design ship components and do manufacturing (including 3-D printing) to further equip the ship model with components and equipment to realise the production process of ship building. Project competition will be carried out to assess the ship's performance.

Marine Auxiliary Systems
The module aims to provide students with a broad understanding of marine piping, pumps, cooling and heating systems; auxiliary machineries onboard ships through hands-on practices on common marine equipment such as valves, strainers, pumps, heat exchangers and diesel engines; and their applications in marine systems design and operations. The green ship technology and ballast water treatment system will be introduced here.

Marine CAD
This module aims to equip students with knowledge of Marine CADCAM software. Topics include the full procedure of hull structural detailed and production design, pipe routing and pipe assemblies. Students are required to carry out 3-D modelling of the marine production design as well as creation of marine components as 3-D objects.

Marine Production Technology
This module aims to help students understand and equip the students with the knowledge in operations and techniques carried out in marine production and QA/QC process throughout the entire production flow in new building yard as well as repair and conversion yard. Marine industry safety and legislation governing occupational safety in workplaces will be covered through the introduction of production process.

Naval Architecture 2
This module aims to provide the students with the principles of the ship/oil-rig launching process, the principles and analysis of vessel resistance and propulsion. Strength of ships using the simple beam theory analogy would be analysed. Problems related to vibration and maneuverability would be discussed.

YEAR 2 COURSE CURRICULUM

Module Name	Credit Units
Level 2.1 (18 hours per week)	
Integrated Real-world Project 3	4
Marine Design Drafting	3
Marine & Offshore Technology	3
Naval Architecture 1	4
Strength of Materials	4
Level 2.2 (20 hours per week)	
Integrated Real-world Project 4	3
Marine Auxiliary Systems	4
Marine CAD	3
Marine Production Technology	4
Naval Architecture 2	4
World Issues: A Singapore Perspective^	2

Notes:
^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is

IS Modules
The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.

YEAR 3 COURSE MODULES

LEVELS 3.1

Integrated Real-world Project 5
The module will equip students with project design, planning and implementation knowledge through projects assigned through the modules. Students will apply their knowledge to solve a real problem related to the marine industry. The module takes students through the entire project cycle. Students carry out project work in groups. Performance of the students is assessed on a continuous basis.

This module will also imbue in students a sense of civic consciousness in the context of engineering and sustainability. It will develop students' competencies in sustainable development, raise their awareness of sustainability in the context of society and the environment, and appreciate the impact engineering solutions may have on the environment.

Marine & Offshore Design
This module aims to provide students with the theoretical and analytical knowledge in marine and offshore design. International conventions such as tonnage, load line assignment and roles of statutory bodies and classification societies will be introduced and discussed. The students will have an opportunity to apply naval architecture learnt in diploma level to work through the iterative marine & offshore design process. With hands-on real design tasks, students are required to complete one round of design spiral to realise the design process and have a real feeling of marine & offshore design work.

Marine Design Applications
This module aims to equip students with knowledge and skills of computer software applications in evaluating the marine design. Advanced marine design and simulation analysis software would also be used in the students' design. Students will be required to ascertain their design feasibility and compliance with rules and regulations from International Maritime Organisation and the classification societies.

Marine Propulsion Systems
This module aims to provide students with fundamental knowledge and understanding of marine propulsion systems, matching of engine and propeller, compressed air system for starting, steering gear systems, reliability concepts applied to machinery design, and marine pollution control. Dual fuel engine applications will be introduced on top of traditional diesel engine applications.

Offshore Engineering
The module aims to provide students with a broad overview of the offshore, oil and gas industry in the world. It covers engineering principles and operations, exploration and exploitation, processes and piping design relating to oil and gas recovery. Students will be exposed to the latest engineering concepts and practices in offshore design, construction and installation. Learning is enhanced through practical sessions on industrial standard software.

LEVELS 3.2

6-Month Internship (Local/Overseas)
The Internship aims to provide practice-oriented training to equip students with the appropriate knowledge, management and communication skills imbued with the right values to work as technologists in marine production. Students will get the chance to understand the organisation structure, company product and go through the work/production flow/project with company employees. Assessment of students' performance and grades will be done by both industry supervisors and NP supervisors.

YEAR 3 COURSE CURRICULUM

Module Name	Credit Units
Level 3.1 (20 hours per week)	
Integrated Real-world Project 5	3
Marine & Offshore Design	3
Marine Design Applications	3
Marine Propulsion Systems	4
Offshore Engineering	3
Project ID: Connecting the Dots^	4
Level 3.2 (20 hours per week)	
6-Month Internship (Local/Overseas)	20

Notes:
^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is

IS Modules
The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.