

## **MARINE & OFFSHORE TECHNOLOGY COURSE MODULES**

You're one step closer to fulfilling your dreams of building your own ship 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 Design Thinking and Practice 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 stand you in good stead 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. You can also choose to major in one of the two specialisations in your final year - Design Option or Oil & Gas Option.

### **LEVELS 2.1 & 2.2**

#### **Career & Professional Preparation II**

This module helps to equip students with skills necessary to seek and secure work. They will also be equipped to communicate their personal brand in a positive way. As students sharpen their communication skills, they will also learn how to market themselves effectively.

#### **Engineering Mathematics 3B**

This module is a continuation of Engineering Mathematics 2. Topics include Integration Techniques & Applications, First Order Differential Equation, Laplace Transform, Probability and Statistics.

#### **Fundamentals of Naval Architecture 1**

This module introduces the world of marine & offshore technology and students learn the basic principles of ship construction and floatation. Students would be inducted into the industry with a strong emphasis on pastoral care and career guidance, infused with NP core values, through exciting and engaging action-learning experiences such as team-building-team-learning (TBTL) sessions, off-campus visits and career and alumni talks.

#### **Fundamentals of Naval Architecture 2**

This module aims to provide students with the basic principles of marine hydrostatics which include the knowledge and understanding of intact stability, large angle stability, trim and damaged stability of a ship. 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.

#### **Marine Auxiliary Systems**

The module aims to provide students with a broad understanding of marine piping, pumps and cooling and heating systems. Students will also learn about auxiliary machineries on board ships through hands-on practice on common marine equipment such as valves, strainers, pumps, heat exchangers and diesel engines, and their applications in marine systems design and operations.

### **Marine Propulsion Systems**

Students will attain a 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.

### **Marine CAD**

Students apply Marine CAD/CAM software to complete the full procedure of hull design and production, including hull form generation, lines fairing, curved surface modelling, planar structure modelling, and generation of production information. They will also carry out 2-D drafting, and then proceed to create marine components as 3-D objects. The module also covers piping programme for pipe routing and pipe assemblies.

### **Marine Design Practice**

This module equips students with the engineering design thinking process that designers adopt to define the problem, do relevant research to acquire information, analyse knowledge and provide creative solutions to the problem in the design and planning fields in the marine and offshore domain. Students have to carry out hands-on computer and lab practices associated with computer aided design and manufacturing to build mock-ups and prototypes. Basic shipyard processes, marine safety and project management skills will be highlighted as an induction and overview for the internship experience.

### **Marine Design Drafting**

The module gives students 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 module comprises short lectures and numerous hands-on exercises in creating design and drafting using various principles and techniques applied on marine design. AutoCAD is taught and used as the tool for design and drafting practical marine examples.

### **Marine Production Technology**

This module aims to help students understand and gain basic knowledge of yard operations and production processes carried out in the various types of yard, from new build to repair and conversion. This module will also impart essential knowledge of welding and various manufacturing processes carried out during different stages of the production process, including weld quality control and various types of non-destructive testing to identify distortion and defects during production.

### **Marine Industry Safety**

This module introduces students to the various important aspects of marine industry safety and legislation governing occupational safety in workplaces. Topics include identification, evaluation and analysis of hazards, control measures and risk assessment.

### **Offshore Drilling & Production**

Students will be introduced to offshore oil production covering marine well-drilling, types of drilling rigs and floating production systems. Topics include separators, gas-treatment, gas flaring, enhanced recovery using water and gas injection, produced water treatment, utility systems, mooring arrangements, storage and export systems. Technical consideration of FPSO conversions, subsea product on systems flow lines and risers, as well as remote-operated vehicles will also be covered.

### **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.

### Interdisciplinary general module (IS Module)

Students embark on a general module from categories ranging from Communication, Life Skills, Entrepreneurship, Media & the Arts to Science & Technology.

### COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 2</b>	2
<b>Level 2.1 (28 hours per week)</b>	
Career & Professional Preparation II	
Engineering Mathematics 3B	4
Fundamentals of Naval Architecture 1	4
Marine Design Drafting	5
Marine Design Practice	3
Marine Auxiliary Systems	5
Offshore Drilling & Production	3
Interdisciplinary Studies (IS) elective ^	2
<b>Level 2.2 (26 hours per week)</b>	
Fundamentals of Naval Architecture 2	5
Marine Propulsion Systems	5
Marine CAD	4
Marine Production Technology	3
Marine Industry Safety	2
Strength of Materials	5
World Issues: A Singapore Perspective ^	2

#### Notes:

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