

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 3.1 & 3.2

COMMON MODULES:

Six-month Internship (Local/Overseas)

The six-month internship will provide students with the opportunity to apply the knowledge acquired in the classroom to work situations, and demonstrate problem solving, communication and interpersonal skills in a work environment. The programme enables students to hone their ability to work independently and in teams, while they take on one or more practical projects under the supervision of industry practitioners. The objective is to develop a professional approach to work based on the relevant code of practice.

Marine Design Project

The module will equip students with design, planning and implementation knowledge through projects assigned based on the particular option chosen, either "Design" or "Oil & Gas". Students will apply their knowledge to solve a real design problem related to the marine industry. The module will take students, working in groups, through the entire design life cycle.

Fundamentals of Naval Architecture 3

This module aims to provide students with the principles of the ship/oil-rig launching process and the principles and analysis of vessel resistance and propulsion. Strength of ships using the simple beam theory analogy will be analysed. Problems related to vibration and manoeuvrability will be discussed. In addition, elements of marine design such as tonnage, load line assignment and roles of statutory bodies and classification societies will be discussed.

Project ID - Connecting the Dots (IS Module)

This module aims to prepare students for an increasingly globalized and interconnected world where problems are multi-faceted and require interdisciplinary research and collaboration to solve. Using a project-based learning approach, students will have the opportunity to work in a multi-disciplinary team to investigate and propose comprehensive recommendations for a pressing real-world problem affecting Singapore. They will be guided to step out of their disciplinary silos and effectively communicate and collaborate with peers from different backgrounds. Ultimately, the module seeks to develop independent learning skills and the ability to synthesize diverse strands of knowledge to solve a complex problem, while impressing on students the importance of being a responsible global citizen.

OIL & GAS SPECIALISATION

Drilling Engineering

This module provides students with an overview of the drilling operations, from planning to completion for production. It develops a functional understanding of the operation and commissioning of various equipment processes and systems involved in the drilling and completion operations. Students are also introduced to analytical methods to select various components of drilling operations and the demonstration of some design problems.

Offshore Topsides Systems

This module provides students with a deeper understanding of the working principles of the offshore topsides systems in the oil and gas upstream process, fundamental organic chemistry, basic production, process plant, equipment and utilities to support the processing of oil and gas. Learning is enhanced through practical sessions on industrial standard software investigating well and flow behaviour.

Subsea Technology

This module provides students with a deeper understanding of subsea systems engineering in offshore oil and gas production. It covers subsea systems, equipment and their architecture, offshore exploration, Remote-Operated Vehicles, subsea processing of oil & gas, subsea control systems, flowline, pipeline and risers.

DESIGN SPECIALISATION

Marine & Offshore Design

This module aims to provide students with theoretical and analytical knowledge in marine and offshore design. Students will have the opportunity to apply the naval architecture knowledge learnt previously in the conduct of marine & offshore design process. The process includes identifying design requirements, data collection, estimation of dimensions, choice of design ratios and hull form. Capacities, weight & centre of gravities (CG) calculations are also included together with stability checks and speed-power estimates.

Marine Design Applications

This module aims to equip students with knowledge and skills of computer software applications in marine design. The emphasis will be placed on carrying out student group work in various preliminary marine designs (e.g. design of container, tanker, bulk carrier, general cargo vessels, offshore oil rigs, etc.). Advanced marine design and simulation analysis software will also be used in the students' design work. Students will be required to ascertain their design feasibility through the classification rules. A critique panel made up of industry partners will share their experiences with the students and also conduct joint assessment with the polytechnic lecturers in a student forum.

Offshore Dynamics

The module aims to help students understand the design considerations for offshore structures. In the analysis and design of offshore structures, students will be introduced to the API RP and ISO 19900 standards for offshore platform design. Topics covered range from various wave theories and diffraction theory, to Morison's theory and spectral modelling approaches. The module will also provide opportunities to explore the capabilities of a software package for offshore dynamics. Overall, students will be exposed to the latest engineering concepts and practices in offshore design, construction and installation.

DIPLOMA PLUS PROGRAMME

The Diploma Plus Programme (DPP) is designed to provide students with proficiency in a selected domain area, either to broaden or deepen their knowledge/ skills in their main discipline of study, or to equip them with additional professional knowledge that would better prepare them for further study or increase their employability. Students can

select elective modules from a wide range of clusters to obtain their Diploma Plus Certificate. DPP is optional and it will not affect the graduating requirement for the award of a diploma.

Students can choose the DPP clusters from the list below. The offer of a DPP cluster is subject to the condition that the minimum class size is met and based on available vacancies.

Engineering Clusters

- Applied Physics#
- Computer-Aided Design Skills (World Skills Singapore)
- Workplace Safety & Health

Other available Diploma Plus Certificates

- Advanced Engineering Mathematics*
- Business**
- Innovation Management
- Foreign Languages

The Applied Physics syllabus is aligned with the NTU's FE1012: Physics A module. NP students who obtain good grades in the Applied Physics modules will be granted exemption from the FE1012: Physics A module.

* The CAEM syllabus is aligned with the 'A' Level H2 Pure Mathematics syllabus. NP graduates who have successfully completed the revised CAEM will be granted exemption from the NUS' MA1301 Proficiency Test.

** Students pursuing the Minor in Business Management cannot take the DPP Certificate in Business (CIB).

COURSE CURRICULUM

Module Name	Credit Units
YEAR 3	
Level 3.1 (23 hours per week)	
OIL GAS SPECIALISATION	
Fundamentals of Naval Architecture 3	6
Drilling Engineering	3
Offshore Topsides Systems	3
Subsea Technology	3
Marine Design Project	4
Project ID: Connecting the Dots ^	4
DESIGN SPECIALISATION	
Fundamentals of Naval Architecture 3	6
Marine & Offshore Design	3

Marine Design Applications	3
Offshore Dynamics	3
Marine Design Project	4
Project ID: Connecting the Dots ^	4
Level 3.2 (22 hours per week)	
Six-month Internship	22

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.