WORK-STUDY DIPLOMA IN MARINE & OFFSHORE ENGINEERING

MODULE OBJECTIVES

Year 1 Common Modules

Shipyard Health, Safety and Environment Management 1
On completion of the module, trainees should be able to apply the knowledge in Workplace Safety & Health Management and operational aspects of marine safety at the shipyard and production workshops

Quality Assurance
On completion of the module, trainees should be able to interpret the requirements of Quality Assurance Systems such as ISO 9001, 14001 employed as part of the Quality Management System. They should also be able to apply fundamental quality assurance tools and techniques for problem solving and quality inspection.

Marine Machinery
On completion of the module, trainees should be able to interpret schematic drawings, install and service equipment of common marine systems such as heating and cooling systems, compressed air systems, etc. onboard ships and offshore installations.

Marine Piping
On completion of the module, trainees should be able to interpret Piping & Instrumentation Drawing (P&ID) of common marine systems. They should also be able to fabricate, install and test piping spools in accordance with the pipe spool drawings of marine vessels and offshore installations.

Marine Electrical Systems
On completion of the module, trainees should be able to interpret electrical drawings, as well as install, service and repair electrical equipment used on board marine vessels and offshore installations such as electrical generators, motors and circuit components. They should also be able to carry out diagnostic checks on marine electrical distribution systems using common test meters, as well as perform cable markings and termination.

Basic Naval Architecture
On completion of the module, trainees should be able to interpret ship general arrangement drawings, tank arrangement drawings and block assembly drawings. They should also be able to produce lines, docking and integrity plans.

Marine Hull Fabrication
On completion of the module, trainees should be able to establish and coordinate assembly works for the fabrication of steel structures and blocks for marine vessels and offshore installations.

Materials Engineering
On completion of the module, trainees should be equipped with the knowledge in basic properties and applications of materials, including post weld heat treatment, failure of metals, corrosion, and surface technology.

Applied Information Technology
On completion of the module, trainees should be equipped with basic knowledge and skills in software programmes commonly used in the marine and offshore industry.

Project Management
On completion of the module, trainees should able to apply the knowledge in ship building processes, shipyard organization, material flow and key concepts of management process, critical path analysis, and use of computer applications for project administration of ship repair or newbuilding projects.

Communication Skills
On completion of the module, trainees should be able to demonstrate both oral and written communication capabilities with essential inter-personal relationship skills.

Integrative Design Thinking
On completion of the module, trainees should be able to make use of design thinking process as an effective tool to inspire original thinking and innovation.

On-the-Job Training I
On completion of the first year on-the-job training (OJT), trainees should be able to apply relevant foundational skills and knowledge from their first year of study to carry out basic engineering tasks at the shipyard.

Year 2 Specialization Modules – Engineering Design

Marine and Offshore Engineering Design 1
On completion of the module, trainees should be able to produce arrangement drawing of mechanical equipment, hull structure and marine piping system in accordance with appropriate standards, classification societies, Safety of Life at Sea (SOLAS) and International Maritime Organization (IMO) requirements.

Applied Engineering Mathematics
On completion of the module, trainees should be able to apply essential mathematical knowledge and analytical skills to naval architectural and marine design work.

Applied Science
On completion of the module, trainees should be able to apply the knowledge of science to marine system and structural design work.

Effective Supervision
On completion of the module, trainees should be able to carry out effective resources allocation and progress monitoring. They should also be able to review work specifications and assembly activities for work improvement.

On-the-Job Training II
On completion of the second year OJT, trainees should be should be able to apply relevant skills and knowledge from their second year of study to carry out engineering tasks independently at the shipyard

Year 3 Specialization Modules – Engineering Design

Marine and Offshore Engineering Design 2
On completion of the module, trainees should be should be able to design marine and offshore electrical and HVAC systems, and prepare drawings in accordance with appropriate standards, classification societies, Safety of Life at Sea (SOLAS) and International Maritime Organization (IMO) requirements.

Advanced Naval Architecture
On completion of the module, trainees should be able to perform engineering calculations to analysis ship flotation, equilibrium and stability, evaluate design considerations for various types of platforms and ships to meet design standards and statutory rules.

Shipyard Health, Safety and Environment Management 2
On completion of the module, trainees should be equipped with the knowledge and skills on legal requirements, roles and responsibilities of a supervisor, workplace safety and health management and risk management implementation systems adopted in the shipyards.

Company Project
On completion of the module, trainees should be able to apply and integrate skills and knowledge acquired throughout the course to a specific problem or issue related to marine and offshore engineering.

On-the-Job Training III
On completion of the third year OJT, trainees should be able to apply relevant skills and knowledge from their third year of study to carry out engineering tasks independently at the shipyard.

Year 2 Specialization Modules – (Repair & Maintenance)

Marine Systems
On completion of the module, trainees should be able to assemble, service and repair components of various marine systems onboard ships and offshore installations including marine propulsion system, cooling water system and lubricating oil system.

Marine Automation and Controls
On completion of the module, trainees should be able to perform testing, fault diagnosis and maintenance of instrumentation and control equipment commonly used in marine and offshore applications.

Quality Control
On completion of the module, trainees should be able to apply appropriate quality control tools for repairs and new construction of ships and offshore structures, check measuring instruments and maintain the quality standards, including record-keeping for traceability purposes.

Effective Supervision
On completion of the module, trainees should be able to carry out effective resources scheduling and progress monitoring. They should also be able to review work specifications and assembly activities for work improvement.

On-the-Job Training II
On completion of the second year OJT, trainees should be able to apply relevant skills and knowledge from their second year of study to carry out engineering tasks independently at the shipyard.

Year 3 Specialization Modules – (Repair & Maintenance)

Marine and Offshore System Commissioning
On completion of the module, trainees should be able to perform functional testing and commissioning of various marine systems and equipment such as marine mechanical systems, marine electrical systems, marine piping systems and drilling systems, in accordance with commissioning procedure.

Marine Machinery Maintenance
On completion of the module, trainees should be able to carry out diagnostics and repair works on marine main and auxiliary equipment and ensure that they are managed and maintained in an operational and safe working condition.

Shipyard Health, Safety and Environment Management 2
On completion of the module, trainees should be equipped with the knowledge and skills on legal requirements, roles and responsibilities of a supervisor, workplace safety and health management and risk management implementation systems adopted in the shipyards.

Company Project
On completion of the module, trainees should be able to apply and integrate skills and knowledge acquired throughout the course to a specific problem or issue related to marine and offshore engineering.

On-the-Job Training III
On completion of the third year OJT, trainees should be able to apply relevant skills and knowledge from their third year of study to carry out engineering tasks independently at the shipyard.

Work-Study Diploma in Marine & Offshore Engineering

S/N	List of Skills(Standard) for Production(Repair & Maintenance) Specialisation
1	Apply permit-to- work system
2	Perform hazards identification
3	Prepare toolbox meeting
4	Enforce adherence to Workplace Safety and Health (WSH) policies
5	Interpret the requirements of ISO 9001 and 14001
6	Apply fundamental quality instruments to lean manufacturing
7	Apply fundamental quality techniques
8	Enforce adherence to Quality Assurance (QA) policies
9	Interpret technical and schematic drawings of common marine equipment installed on-board ships and offshore vessel
10	Install marine equipment on-board ships and offshore vessel.
11	Perform routine servicing of marine equipment installed on-board ships and offshore vessel as specified by OEM.
12	Install and test water system (Potable water system, Drill water system, Waste water system, Cooling System)
13	Install and test auxiliary marine systems (compressed air systems, fuel oil systems, marine auxiliary systems
14	Install and test cargo systems
15	Install and test firefighting systems
16	Install and maintain communication & navigation systems (communication system, navigation system)
17	Install and maintain electrical systems (main switchboard and transformer, fire and gas detection system, emergency shutdown (ESD) system, emergency back-up system/stand-by system)
18	Interpret ship's vessel drawing (arrangement dwg, compartment dwg, hull structural dwg)
19	Produce vessel plan (lines plan, docking plan, integrity plan, tank capacity plan)
20	Fabricate steel structures
21	Fabricate blocks
22	Perform erection of blocks
23	Perform equipment coding to ease segregation of products and equipment in the production workflow
24	Establish assembly job requirements and sequence of operations
25	Coordinate transfer of sub-assemblies and/or work pieces across work stations
26	Monitor projects
27	Monitor project resources
28	Coordinate rectification of defects and other issues found

S/N	List of Skills(Standard) for Production(Repair & Maintenance) Specialisation
29	Install and assemble components of common marine systems used on-board ships and offshore vessel
30	Service marine system components to maintain optimum performance
31	Repair faulty components of marine equipment used on ships and offshore vessel
32	Troubleshoot main switchboard
33	Troubleshoot safety systems
34	Troubleshoot communication systems
35	Troubleshoot electrical installation in hazardous area
36	Troubleshoot emergency systems
37	Troubleshoot engine start-up system
38	Troubleshoot tank level gauging system
39	Troubleshoot vessel management system
40	Identify non-compliances of metal scaffolding
41	Monitor surface preparation
42	Monitor quality of welding processes and weldment
43	Verify conformance to welding procedures
44	Verify documentation of welders' qualifications
45	Perform quality inspection with precision measuring tools
46	Determine suitable non-destructive tests (NDT) methods for post-assembly testing
47	Coordinate marine survey inspections by owners, classification societies and other stakeholders
48	Apply project planning techniques
49	Monitor project progress
50	Monitor execution of department goals
51	Prepare production workflows for projects
52	Review work specifications to identify waste and cost reduction opportunities
53	Review current assembly activities and present ideas for work improvement
54	Perform testing and commissioning of engine start-up system
56	Perform testing and commissioning of vessel management system
57	Perform testing and commissioning of cargo systems
58	Perform testing and commissioning of firefighting systems
56	Perform testing and commissioning of freshwater systems
59	Perform testing and commissioning of drill water system
60	Perform testing and commissioning of waste water systems
S/N	**List of Skills(Standard) for Production(Repair & Maintenance) Specialisation**
61	Perform testing and commissioning of compressed air systems

62	Perform testing and commissioning of lighting systems
63	Perform pre-commissioning inspections
64	Maintain and troubleshoot marine auxiliary systems
65	Maintain and troubleshoot boiler system
66	Maintain and troubleshoot inert gas system
67	Maintain and troubleshoot deck machinery
68	Resolve shortcomings in machinery performance
69	Prepare execution plan for installation of specific machinery, equipment and/or systems
70	Perform health, safety and environment related roles
71	Perform workplace safety, health inspection and audit
72	Perform risk assessment
73	Conduct accident investigation
74	Report work activities to vessel safety co-ordination committee (VSCC)