



MARITIME ENGINEERING AT THE SUPPORT LEVEL

TECHNICAL-PROFESSIONAL

Grade 12

**Three-Term Budget Of Work (BOW)
for Learning Competencies**

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MARITIME
Grade 12**

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For Learning Competencies**

Please note that each Tech-Pro elective is completed within one term delivered at Grade 12.

Elective	Maritime Engineering at the Support Level
Prerequisite	None

Performance Standard	The learners demonstrate the skills in the engine room piping system based on the Maritime industry standard.
Content Standard	The learners demonstrate understanding of maintaining the safe engineering watch through monitoring and controlling the operation of a main propulsion and auxiliary machineries; the correct water level and steam pressure of the boiler; emergency procedures and emergency equipment in machinery spaces especially in the engine room operation including communication relevant to engine watchkeeping and the safe working practices and use of electrical equipment.

Week	Learning Competency	Suggested Activities
1	Discuss the shipping industry and its career opportunities	Shipping Industry Overview Report - Write a report highlighting the major sectors of the shipping industry and the types of careers available in each sector. Explore the Seas of Opportunity - Present the role of the shipping industry in global trade and identify various maritime career opportunities.
	Discuss the regulatory bodies and conventions in the shipping industry	Regulatory Research - Research major regulatory bodies and conventions (e.g., IMO, SOLAS) and

Week	Learning Competency	Suggested Activities
		summarize their roles in maritime operations. • Convention Comparison Table ◦ Create a table comparing the main international maritime conventions, their objectives, and the rules they enforce.
	• Discuss the stressors and emotional challenges of seafarers	• Reflection Essay ◦ Write a reflection on the common stressors seafarers face and strategies to cope with them. • Stress Management Plan ◦ Develop a plan with practical measures to manage stress and improve mental health
2	• Discuss the shipboard organization and its functions according to the level of responsibility	• Chart the Crew ◦ Create a chart showing the hierarchy of shipboard positions and their responsibilities. • Role Analysis ◦ Write a brief analysis explaining the duties of different levels of shipboard officers and crew members.
	• Discuss the type of ships and operations, parts, dimensions and terminologies used in ships direction	• Ship Type Classification ◦ Prepare a chart classifying ships by type, function, and operation. • Terminology Glossary ◦ Compile a glossary of essential ship parts, dimensions, and navigation terms with definitions.

Week	Learning Competency	Suggested Activities
	Discuss the purpose charter party agreement in ship's trading services	Charter Party Summary - Write a summary explaining the purpose, types, and main clauses of charter party agreements. Case Study Analysis - Analyze a sample charter party agreement and identify key responsibilities of shipowners and charterers.
3	Discuss the safety and security code for the protection of personnel, ship, cargo, and the environment	Safety Code Report - Research the ISPS Code and write a report on its importance in protecting shipboard personnel, cargo, and the environment. Scenario Safety Assessment - Analyze a shipboard scenario and recommend safety and security measures according to the ISPS Code.
	Discuss shipboard machinery and equipment	Machinery Identification Report - Write a report identifying main and auxiliary shipboard machinery and their functions. Equipment Diagram - Draw a labeled diagram of shipboard machinery and equipment showing their placement and function.
	Perform gauge measurement	Measurement Practice - Perform gauge readings on simulated or real equipment and record the data accurately.

Week	Learning Competency	Suggested Activities
		• Data Analysis Exercise ○ Analyze recorded gauge measurements, identify anomalies, and report findings.
	• Illustrate the different piping system in the engine room	• Piping Diagram ○ Draw diagrams illustrating the different piping systems in a ship's engine room. • System Function Table ○ Create a table describing the purpose and function of each piping system in the engine room.

Content Standard	The learners demonstrate understanding of maintaining the correct water level and steam pressure of the boiler, emergency procedures in machinery spaces, operation of emergency equipment, safe engineering watch, communication relevant to engine watchkeeping, monitoring and controlling of an engine room watch, and understanding of the safe working practices and use of electrical equipment.
Performance Standard	The learners demonstrate the skills in maintaining a safe engineering watch and safe working practices on the different shipboard scenarios.

Week	Learning Competency	Suggested Activities
4	• Use communication equipment relevant to engine room watchkeeping operations	• Equipment Operation Practice ○ Demonstrate the use of radios, alarms, and monitoring systems for engine room communication. • Communication Scenario Simulation ○ Simulate a scenario where engine room communication is critical and document correct procedures.

Week	Learning Competency	Suggested Activities
5	Demonstrate emergency duties in response to emergency situations onboard as stated in the station bill	Emergency Drill Practice - Practice the steps for responding to emergency scenarios onboard according to the station bill. Emergency Response Planning - Develop a plan detailing duties and responsibilities during emergencies on a ship.
6	Perform the operations of emergency equipment in the engine room in accordance with the standard safety procedures	Emergency Drill Practice - Practice the steps for responding to emergency scenarios onboard according to the station bill. Emergency Response Planning - Develop a plan detailing duties and responsibilities during emergencies on a ship.

Suggested Performance Tasks	Individual Activity Piping System Diagram Task: Draw and label the engine room piping system, including main lines, valves, and connections, explaining their function according to maritime standards. Group Activity Piping System Simulation Task: In groups, assemble a model or mock-up of an engine room piping system, demonstrating proper flow, connections, and safety checks.
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Performance Standard	The learners demonstrate the skills in maintaining a safe engineering watch and safe working practices on the different shipboard scenarios.
Content Standard	The learners demonstrate understanding of maintaining the correct water level and steam pressure of the boiler, emergency procedures in machinery spaces, operation of emergency equipment, safe engineering watch, communication relevant to engine watchkeeping, monitoring and controlling of an engine room watch, and understanding of the safe working practices and use of electrical equipment.

Week	Learning Competency	Suggested Activities
7	Discuss watchkeeping duties for proper relief, maintenance, and handover of the watch	Watchkeeping Procedure Notes - Write a detailed note on proper watchkeeping duties, including relief and handover procedures. Watchkeeping Scenario Simulation - Simulate a watch relief scenario and practice proper documentation, communication, and handover procedures.
	Perform monitoring, maintaining, and recording the safe operating parameters of the marine steam boiler	Boiler Monitoring Practice - Record and monitor marine steam boiler parameters under standard operating conditions. Parameter Analysis Exercise - Analyze boiler readings, detect anomalies, and suggest corrective actions.

Week	Learning Competency	Suggested Activities
	Perform monitoring and controlling of an engine room watch.	Engine Room Watch Simulation - Monitor engine room equipment, log readings, and maintain safe operating parameters. Watch Evaluation Exercise - Evaluate recorded data from the engine room watch and propose necessary adjustments.
8	Perform safe working practices in shipboard in accordance with Safety Management System (SMS) manual.	Safety Practices Reflection - Write a reflection on the importance of safe working practices in shipboard operations. SMS Compliance Exercise - Review a shipboard procedure and assess compliance with the SMS manual, identifying potential hazards.
	Perform safe use of electrical equipment on shipboard maintenance and repair.	Electrical Safety Practice - Perform maintenance or repair on shipboard electrical equipment safely. Safety Procedure Documentation - Develop a step-by-step guide for safely maintaining and repairing electrical equipment on board.

Suggested Performance Tasks	Individual Activities • Engineering Watch Reflection Task: Write a reflection on the responsibilities and procedures of maintaining a safe engineering watch, highlighting potential hazards and mitigation. Group Activities • Watchkeeping Scenario Drill Task: In groups, simulate different shipboard scenarios requiring safe watchkeeping, including shift handover, emergency response, and routine monitoring.
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Performance Standard	The learners perform shipboard maintenance and repair.
Content Standard	The learners demonstrate understanding of the shipboard maintenance and repair.

Week	Learning Competency	Suggested Activities
9	Perform shipboard maintenance and repair of main and auxiliary machinery and equipment	• Machinery Maintenance Practice ○ Perform routine maintenance on main or auxiliary machinery following standard procedures. • Maintenance Log Creation ○ Create a maintenance log documenting procedures, checks, and observed issues.

Performance Standard	The learners apply procedure in prevention of pollution, safe operation of equipment and machinery, fueling and oil transfer operations, bilge and ballast operations, and handling of stores
Content Standard	The learners demonstrate understanding of anti-pollution equipment, operation of equipment and machinery, fueling and oil transfer operations, operating procedures of bilge and ballast system transfer operations, and handling of stores

Week	Learning Competency	Suggested Activities
10-11	Apply procedures in the prevention of pollution of the marine environment.	Pollution Prevention Report - Write a report on procedures and best practices for preventing marine pollution onboard. Environmental Scenario Analysis - Analyze a scenario where pollution could occur and recommend preventive measures.
	Perform safe operation of equipment and machinery in accordance of manufacturers manual.	Equipment Operation Practice - Operate machinery following the manufacturer's manual to ensure safety and proper functioning. Operation Procedure Checklist - Create a checklist of steps to safely operate specific shipboard machinery.
	Perform fueling and oil transfer operations in accordance with standard safety procedures.	Fuel Transfer Simulation - Perform a simulated fueling or oil transfer operation while adhering to standard safety procedures.

Week	Learning Competency	Suggested Activities
		• Safety Procedure Review ◦ Develop a guide detailing safety precautions and procedures during fuel and oil transfer operations.
	• Perform bilge and ballast operations in accordance with standard safety procedures.	• Bilge/Ballast Operation Practice ◦ Perform bilge and ballast operations safely, ensuring proper monitoring and recording. • Operation Analysis Exercise ◦ Analyze bilge and ballast procedures and identify potential hazards or inefficiencies.
	• Perform handling of stores in accordance with standard safety procedures.	• Stores Handling Practice ◦ Safely handle, store, and organize shipboard supplies according to standard procedures. • Stores Safety Plan ◦ Develop a plan for safe handling, storage, and inventory of shipboard stores.
Suggested Performance Tasks	Individual Activities • Engineering Watch Reflection Write a reflection on the responsibilities and procedures of maintaining a safe engineering watch, highlighting potential hazards and mitigation. Group Activities • Watchkeeping Scenario Drill In groups, simulate different shipboard scenarios requiring safe watchkeeping, including shift handover, emergency response, and routine monitoring.	