Part A
Course Framework

■ Scope

This **Management Level Course for Marine Engineer Officers (Function 1)** covers the mandatory minimum requirement for approved education and training as provided for under Regulation III/2 of the STCW Convention, 1978, as amended for chief engineers and second engineers on ships powered by main propulsion machinery of 3,000 kW propulsion or more; and to meet the minimum standard of competence specified in Section A-III/2 of the STCW Code under Function: Marine Engineering at the Management Level.

This course requires a total of **one hundred sixteen (116)** instructional hours to cover the topics enumerated in Part B – Course Outline.

■ Training Outcomes

To meet the minimum standard of competence to undertake the tasks, duties, and responsibilities at the management level specified under Table A-III/2 (Function 1) in Section A-III/2 of the STCW Code.

Specifically, at the end of the course, the trainee must be able to:

- manage the operation of propulsion plant machinery;
- plan and schedule operations;
- operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery; and
- manage fuel, lubrication and ballast operations.

■ Entry Standards

Entry to the course is open to Marine Engineer Officers who are holders of a Certificate of Competency (COC) under Regulation III/1 of the STCW Convention, 1978, as amended, and have an approved seagoing service as an Officer in Charge of an Engineering Watch on ships powered by main propulsion machinery of 750kW or more for not less than 12 months.

■ Course Certificate

Upon successful completion of the course, a Certificate of Completion shall be

issued certifying a holder's compliance of the mandatory minimum requirements as specified in Regulation III/2 of the STCW Convention, 1978, as amended, and met the minimum standard of competence under Table A-III/2 Function 1 in Section A-III/2 of the STCW Code.

■ Course Intake Limitation

The number of trainees shall not exceed twenty-four (24) per class.

■ Staff Requirements

The course must have an Instructor and Assessor with a valid Certificate of Accreditation as Instructor and Assessor respectively for Function 1 of Management Level Course for Marine Engineer Officers issued by the Administration.

The engagement of a **Resource Person** shall be allowed only for Topic 9 on Marine Steam Turbine with the same qualification requirements as the instructor. Additionally, he/she must be:

- an accredited Instructor for Marine Steam Turbine; **OR**
- completed training on Marine Steam Turbine from MTI accredited by the Administration; **OR**
- a holder of a Certificate of Proficiency (COP) in Basic and Advanced Training for Liquefied Gas Tanker Cargo Operations with at least one (1) year seagoing service as Marine Engineer Officer on a liquefied gas tanker propelled by marine steam turbine; **OR**
- with at least one (1) year seagoing service as Marine Engineer Officer on a vessel propelled by steam turbine.

Additionally, the Supervisor of training and assessment may be assumed by the training manager, training director or any person designated by the MTI. It shall be required that he/she has full understanding of the training program and the specific objectives for this training course, and has undergone IMO Model Course 6.09 and IMO Model Course 6.10. On the supervision in the conduct of assessment, he/she shall have full understanding of the assessment system, assessment methods, and practice and has undergone IMO Model Course 3.12.

■ Assessment

In determining the achievement of the required competence in Column 1 of Table A-III/2 under the Function: "Marine Engineering at the Management Level," the assigned assessor shall be guided by the Intended Learning Outcomes stipulated in the Course Syllabus and the assessment tasks enumerated in the Assessment Plan.

■ Teaching Facilities and Equipment

For the theoretical aspect of the course, lectures and demonstrations shall be held in a classroom with set of functional audio-visual equipment. The classroom must have an area of at least 42 square meters (sqm) with no side less than 5 meters and no structural obstruction. If the classroom is less than 42 sqm, the number of trainees that can be accommodated will be computed based on the 1.75 sqm area per trainee requirement, provided that no side shall be less than 5 meters.

For the conduct of practical exercises and assessment, the following training facilities and equipment shall be available:

Items	Quantity
Facilities and Equipment	
● Full Mission Engine Room Simulator capable of simulating a realistic environment for the following STCW competences under Table A-III/2: - manage the operation of propulsion plant machinery; - plan and schedule operations; - operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery; and - manage fuel, lubrication and ballast operations.	1 full mission engine room simulator and 5 workstations
● Computer sets with programs capable of: - operating limits of marine steam turbine propulsion plant; - conducting surveillance, performance assessment and maintaining safety of marine steam turbine propulsion; and - troubleshooting common faults or alarms. *Note: If the Full Mission Engine Room Simulator and 5 workstations are already capable of simulating the expected outcomes for marine steam turbine, computer sets are no longer required.*	*12 workstations*
● Instructor's Console/station capable of controlling the simulators or computer sets.	1 console/station
● A briefing/debriefing room equipped with playback system separate from the simulator room	1 room

Notes:

1. *Engine room simulator equipment shall be compliant with the performance standards as specified in Section A-I/12 Paragraph 1 and must be capable of simulating a main and auxiliary machinery system as specified under Section B-I/12 Paragraph 73.*

2. *The required number of workstations including the full mission engine is sufficient for the maximum intake of 24 trainees following the prescribed workstation-to-trainee ratio of 1 full mission: 4 trainees and/or 1 computer set: 2 trainees.*
3. *All equipment must be labeled with MTI's name.*
4. *In addition to the required training equipment, the following must be available and permanently marked "**FOR EMERGENCY PURPOSES USE ONLY**" and must be placed in an accessible area:*
   - *First aid kit;*
   - *Stretcher;*
   - *Resuscitation kit with oxygen; and*
   - *Suction unit.*

■ Teaching Aids (A)

A1 Visual Presentations

A2 Training videos related to the topics

Note: When using videos and images from external sources, the MTI shall ensure that these are obtained from reliable sources, deliver accurate information, are of high-resolution quality, and adhere to educational or industry standards, and in accordance with the approved criteria established by the Accreditation Division. Appropriate references/acknowledgements shall be indicated in the presentation slides.

A3 Diagrams
- Control Mechanism of marine steam turbine
- Piping system for warm up of marine steam turbine plant
- Performance curve graph

A4 Sample Manuals
- Instruction/Operation/Manufacturer's Manual
- Manufacturer's instruction manual for marine steam turbine

A5 Sample Worksheet
- Ship's Energy Efficiency Management Plan (SEEMP)
- Bunker Saving Plan
- Daily Work Order
- Engine Data Sheet

A6 Simulator and/or Computer Set Familiarization Checklist

A7 Exercise Sheets

A7.1 Supervise the function test of all critical equipment and machinery

A7.2 Plan the starting up of main diesel engine and associated systems
A7.3 Plan the shutting down of diesel engine and associated systems
A7.4 Plan a ship's energy efficiency
A7.5 Plan the performance assessment of main propulsion plant and auxiliary machinery
A7.6 Manage the preparation of main diesel engine for the start-up and make available fuels, lubricants, cooling water, and air
A7.7 Supervise the checking of the pressures, temperatures, and revolutions during the start-up and warm-up period
A7.8 Conduct surveillance of main diesel engine and its associated auxiliary systems
A7.9 Check the performance of main diesel engine and associated system
A7.10 Supervise the preparation of the main diesel engine for the shutting and cooling down operation
A7.11 Conduct surveillance of the shutting down of main diesel engine and its associated systems
A7.12 Supervise the checking of the condition of the main diesel engine if within operating limits
A7.13 Conduct surveillance in checking the efficient operation of main diesel engine and auxiliary machinery
A7.14 Assess the performance of main diesel engine and auxiliary machinery
A7.15 Verify the load capacity of main diesel engine and auxiliary machinery using various methods
A7.16 Supervise the operation of the main diesel engine and auxiliary machinery to maintain safety
A7.17 Supervise the conduct of surveillance and performance check of automatic control system for main engine to maintain safe operation conditions
A7.18 Supervise the conduct of surveillance and performance check of automatic control for generator distribution systems, steam boilers, oil purifier, refrigeration system, pumping and piping systems, and cargo-handling equipment and deck machinery to maintain safe operating conditions
A7.19 Check the operating limits of marine steam turbine propulsion plant during start up and warm up period
A7.20 Analyze the result from the checked parameters and take appropriate actions
A7.21 Conduct surveillance and performance assessment using the gathered data
A7.22 Analyze the result of surveillance and performance assessment conducted and take appropriate actions
A7.23 Manage the carrying out of fuel and ballast operations

■ IMO References (R)

R1 *International Convention on Standards of Training, Certification and Watchkeeping (STCW) for Seafarers 1978, as amended* (latest edition)

R2 *International Convention for the Safety of Life at Sea (SOLAS), as amended* (latest edition)

R3 *International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)* (latest edition)

R4 International Maritime Organization. *Ballast Water Management Convention* (latest edition)

R5 *International Safety Management (ISM) Code* (latest edition)

Note: MTIs may use additional references as deemed necessary to meet the intended learning outcomes.

■ Bibliography (B)

B1 Cowley, J. (Ed.). (latest edition). *The running and maintenance of marine machinery*. Institute of Marine Engineers.

B2 Embleton, W., & Jackson, L. (Eds.). (latest edition). *Reed's 3: Applied heat for engineers*. Thomas Reed.

B3 Flanagan, G. T. H. (latest edition). *Marine boilers*. Elsevier Butterworth-Heinemann.

B4 Griffiths, D. (latest edition). *Marine low speed diesel engines*. Institute of Marine Engineers.

B5 Griffiths, D. (latest edition). *Marine medium speed diesel engines*. Institute of Marine Engineers.

B6 Heywood, J. B. (latest edition). *Internal combustion engine fundamentals*. McGraw-Hill Science.

B7 International Chamber of Shipping (ICS) & International Ship and Finance Federation (ISF). (latest edition). *Guidelines on the application of the IMO International Safety Management (ISM)*. ICS/ISF Publications.

B8 Jackson, L. (latest edition). *Reed's volume 10: Instrumentation and control systems (Reed's marine engineering series).* Thomas Reed Publications. ISBN: 0947637869

B9 Knak, C., & Gad, G. E. C. (latest edition)*. Diesel motor ships: Engines and machinery*.

B10 Manufacturer’s instruction manual for marine steam turbine. (latest edition). *A Shipyard*.

B11 Milton & Reach. (latest edition). *Marine steam boilers*. Butterworth-Heinemann.

B12 Morton, T. D. (latest edition). *Reed's volume 9: Steam engineering knowledge for marine engineers*. Thomas Reed Publications.

B13 Morton, T. D., & Embleton, W. (latest edition). *Reed's volume 12: Motor engineering knowledge for marine engineers*. T. Reed.

B14 Naval Education and Training Support Command. (latest edition*). Introduction to marine gas turbines*. United States Government Printing Office.

B15 Osbourne, A., & Hunt, E. C. (Eds.). (latest edition). *Modern marine engineer's manual, vol. 2*.

B16 Taggart, R. (latest edition). *Ship design and construction*. Society of Naval Architects and Marine Engineers (SNAME). ISBN: 0960304800

B17 Woodyard, D. (latest edition). *Pounder's marine diesel engines and gas turbines*. Butterworth-Heinemann.

Note: The MTI may choose books from the above bibliography, or they may use the latest edition of other references provided that their contents will address the required learning outcomes. Electronic publications may be accepted as alternatives to printed copies of the latest editions and must be sourced from authorized publishers.