

College of Micronesia – FSM
P.O. Box 159
Kolonia, Pohnpei

Course Outline Cover Page

Engineering Knowledge – General II

Course Title

ME 233

Department and Number

Course Description: This course will provide the student with the knowledge and skills required to safely operate, maintain and manage the auxiliary equipment on a vessel not exceeding 750 kW propulsion power.

Prepared by: Brent Villiers

State: FSM-FMI

	Hours per Week	No. Of Weeks	Total Hours	Semester
Credits				
Lecture	3/6/12/24	16/8/4/2	48	3
Laboratory	3/6/12/24	16/8/4/2	48	1
Total Semester Credits:				4

Purpose of Course

Degree Requirement _____ XX _____
Degree Elective _____
Advanced Certificate _____
Certificate _____
Remedial _____
Other (Workshop) _____

Prerequisite Course(s): ME 226 Engineering Knowledge - General, ME 227 Engineering Knowledge - Motor.

Signature, Chairman, Curriculum Committee

Date Approved by Committee

Signature, President, COM-FSM

Date Approved by the President

General Objective: On successful completion of this course, the student will be able to safely operate, maintain and manage the auxiliary equipment on a vessel not exceeding 750 kW propulsion power.

Learning Outcomes: On successful completion of this course the student will be able to:

1. Revise the learning outcomes in ME 226 Engineering Knowledge – General.
2. Manage and maintain a safe working environment on board a vessel in accordance with safety and statutory requirements.
3. Describe the characteristic and use of materials in marine engineering, and explain their repair, treatment, and testing procedures.
4. Operate, maintain, and manage hydraulic and steering equipment on vessels in accordance with manufacturer recommendations and statutory requirements.
5. Operate, maintain, and manage the refrigeration and air condition plants on vessels in accordance with operating manuals, safety and statutory requirements, and environmental concerns.
6. Identify fire related hazardous situations on vessels and operate, maintain, and manage the emergency equipment and systems in accordance with established emergency procedure.
7. Manage the engine room operations and crew in accordance with operational requirements and competence.
8. Manage the engine room operations and crew in accordance with operational requirements and competence.

STUDENTS SHOULD BE MADE AWARE OF OCCUPATIONAL HEALTH AND SAFETY ISSUES IN ALL SITUATIONS AND BE EXPECTED TO DEMONSTRATE SAFE WORKING PRACTICES AT ALL TIMES.

Outline of Content:

This course contains:

1. Safety Equipment
 - Lifting gear
 - Confined spaces and tanks and hot work
 - Protective clothing and safety equipment
 - Survey requirements

2. Materials, Heat Treatment and Welding
 - Material, application, and repair
 - Heat treatment
 - Welding and testing
 - Principal components manufacture
3. Steering Gears and Hydraulic Systems
 - Pumps, motors, and rams
 - Rotary vane
 - Control systems
 - Survey requirements
4. Refrigeration
 - Temperature and pressures
 - Temperature control
 - Safety
 - Fault finding
 - Brine systems
 - Air conditioning plants
 - Operation and maintenance
5. Emergency Procedures
 - Fixed and portable fire fighting appliances
 - Flammable liquids and gases
 - Fire detection systems
 - Testing and survey requirements
 - Operation and maintenance
6. Engine room Management
 - Staff management
 - Task allocation and prioritizing
 - Condition monitoring and planned maintenance
 - Records, logs, stores, and spares
 - Dry docking/slipping
 - Repair and maintenance
 - Emergency and contingency plans
 - Statutory and classification societies requirements
7. Steam Systems
 - Low and medium pressure boilers
 - Fittings
 - Steam distribution and return system
 - Feed water system
 - Testing and treatment
 - Hazards, safety, and safety devices
 - Operation and maintenance
 - Survey requirements

Learning Outcomes:	On completion of this course the learner will be able to:
Learning Outcome 1	Revise the learning outcomes in ME 226 Engineering Knowledge – General.
Assessment criteria	1.1 As per module ME 226 Engineering Knowledge – General.
Conditions and Method of assessment	As specified in the Assessment Strategy listed at the end of this outline and by a combination of: <ul style="list-style-type: none"> • Written assessment • Calculations • Assignments • Oral assessment • Practical assessment
Learning Outcome 2	Manage and maintain a safe working environment on board a vessel in accordance with safety and statutory requirements.
Assessment criteria	2.1 Preparation, testing, gas freeing, certification, and management of: <ul style="list-style-type: none"> • Entering confined spaces and tanks; • Carrying out hot work; and • Operating and maintaining machinery in accordance with legislation requirements, code of practice, permits to work, and environmental concerns are demonstrated. <p>2.2 Testing and maintenance of lifting gear in accordance with safety and statutory requirements are demonstrated.</p> <p>2.3 Compliance of safety equipment with statutory requirements is demonstrated.</p>
Conditions and Method of assessment	As specified in the Assessment Strategy listed at the end of this outline and by a combination of: <ul style="list-style-type: none"> • Written assessment • Calculations • Assignments • Oral assessment • Practical assessment

Learning Outcome 3 **Describe the characteristic and use of materials in marine engineering, and explain their repair, treatment, and testing procedures.**

- Assessment criteria
- 3.1 The basic properties of commonly used material in marine engineering are explained.
 - 3.2 The applications and repair methods of the material in 3.1 in accordance with manufacturer recommendations and established rules are demonstrated.
 - 3.3 Common heat treatment processes are explained.
 - 3.4 Basic welding processes, testing processes, and related safety aspects in accordance with statutory requirements are demonstrated.

- Conditions and Method of assessment
- As specified in the Assessment Strategy listed at the end of this outline and by a combination of:
- Written assessment
 - Calculations
 - Assignments
 - Oral assessment
 - Practical assessment

Learning Outcome 4 **Operate, maintain, and manage hydraulic and steering equipment on vessels in accordance with manufacturer recommendations and statutory requirements.**

- Assessment criteria
- 4.1 The operation and maintenance of:
 - Uni and bi-directional hydraulic pumps and motors;
 - Hydraulic rams; and
 - Control mechanisms for hydraulic equipment,
 in accordance with manufacturer recommendations, statutory and safety requirements are demonstrated.
 - 4.2 The operation and maintenance of hydraulic steering gear, rotary vane steering gear, and four ram steering gear are explained.
 - 4.3 The survey requirements of steering gear systems are explained.

Conditions and Method of assessment	<p>As specified in the Assessment Strategy listed at the end of this outline and by a combination of:</p> <ul style="list-style-type: none"> • Written assessment • Calculations • Assignments • Oral assessment • Practical assessment
Learning Outcome 5	Operate, maintain, and manage the refrigeration and air condition plants on vessels in accordance with operating manuals, safety and statutory requirements, and environmental concerns.
Assessment criteria	<p>5.1 Operational temperatures and pressures in accordance with technical specifications are identified.</p> <p>5.2 The methods of temperature control are described</p> <p>5.3 The management of refrigeration equipment and systems in accordance with statutory and safety requirements, manufacturer recommendations, and environmental concerns is demonstrated.</p> <p>5.4 Fault finding methods and defect recognition in accordance with technical specifications are demonstrated.</p> <p>5.5 The operation and maintenance of air condition plants in accordance with manufacturer recommendations and statutory requirements are demonstrated.</p> <p>5.6 Density and corrosion control related to brine systems are explained.</p>
Conditions and Method of assessment	<p>As specified in the Assessment Strategy listed at the end of this outline and by a combination of:</p> <ul style="list-style-type: none"> • Written assessment • Calculations • Assignments • Oral assessment • Practical assessment
Learning Outcome 6	Identify fire related hazardous situations on vessels and operate, maintain, and manage the emergency equipment and systems in accordance with established emergency procedure.

Assessment criteria	6.1	The properties of flammable liquids and gases are explained.
	6.2	The management of fire detection systems, including testing procedures, in accordance with statutory requirements and technical specifications are demonstrated.
	6.3	The operation, maintenance, and management of fixed and portable fire fighting appliances statutory requirements and technical specifications are demonstrated.
	6.4	Compliance of fire detection, isolation, and fighting equipment with statutory requirements are demonstrated.

Conditions and Method of assessment	As specified in the Assessment Strategy listed at the end of this outline and by a combination of: <ul style="list-style-type: none"> • Written assessment • Calculations • Assignments • Oral assessment • Practical assessment
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Learning Outcome 7 Manage the engine room operations and crew in accordance with operational requirements and competence.

Assessment criteria	7.1	The duties of the Chief Engineer, including: <ul style="list-style-type: none"> • The allocation of engine room duties; • Managing staff; • Prioritizing tasks; • Training of staff; • Planned maintenance; • Condition monitoring; • Records and log keeping; and • Stores and spare control in accordance with established procedure, operational and safety requirements are demonstrated.
	7.2	Emergency procedures and contingency plans in relation to the safety of the personal and the vessel are outlined.
	7.3	Staff and task allocation in preparation for maintenance, repairs, docking/slipping, and surveys in accordance to established procedure are demonstrated.

- 7.4 Management of dry docking/slipping operations, including pre, during, and after the docking/slipping in accordance to established procedures, safety and statutory requirements are demonstrated.
- 7.5 Compliance with statutory requirements and classification societies are outlined.
- 7.6 Methods and items of reports to the vessels owners in accordance with established procedure are demonstrated.

Conditions and
Method of assessment

As specified in the Assessment Strategy listed at the end of this outline and by a combination of:

- Written assessment
- Calculations
- Assignments
- Oral assessment
- Practical assessment

Learning Outcome 8

Manage the engine room operations and crew in accordance with operational requirements and competence.

Assessment criteria

- 8.1 The uses of steam on board vessels are identified.
- 8.2 Basic medium to low-pressure boiler construction, including fittings, in accordance with safety and statutory requirements are explained.
- 8.3 The operation, checks, and maintenance of:
 - Medium to low pressure boilers;
 - Safety devices; and
 - Fittings
 in accordance with manufacturers recommendations, safety and statutory requirements are demonstrated.
- 8.4 The basic feed water system, testing, and treatment are explained.
- 8.5 The basic steam distribution and return systems are explained.
- 8.6 Hazards and safety requirements of steam and steam plants are identified.
- 8.7 Compliance with statutory requirements of medium to low-pressure steam plants is identified.

Conditions and Method of assessment	<p>As specified in the Assessment Strategy listed at the end of this outline and by a combination of:</p> <ul style="list-style-type: none"> • Written assessment • Calculations • Assignments • Oral assessment • Practical assessment
<u>Delivery strategy</u>	<p>The course provides for delivery by on and off-the-job training and assessment.</p> <p>Some areas of content may be common to more than one learning outcome, and therefore integration of training and assessment may be appropriate.</p> <p>Methods of instruction includes:</p> <ol style="list-style-type: none"> 1. Classroom lectures with handouts, course notes, overhead transparencies (or equivalent), slide presentations, video material, and whiteboard notes; 2. Tutorials; 3. Practical demonstrations; 4. Practical exercises; and 5. Laboratory work.
<u>Resource requirements</u>	<p>Delivery of the training will require:</p> <ul style="list-style-type: none"> • Classroom • Whiteboard • Overhead projector (or equivalent) • Video player • Access to an approved diesel powered vessel • Appropriate models • Appropriate testing equipment • Appropriate tools and safety equipment
Assessment Method	<p>Knowledge based criteria will be satisfied through a combination of calculations, written and oral assessments.</p> <p>Skill based criteria will be satisfied through practical exercises.</p>
Condition of Assessment	<p>This course may be assessed on and off-the-job. Competence may be assessed in the following situations: classroom; laboratories; and appropriate vessels.</p>

Evaluation:

Final Grade for this course will be based on meeting the course requirements at the following percentage rates:

96% - 100%	A – Superior
90% - 95%	B – Above Average
80% - 89%	C – Average
69% - 79%	D – Below Average
0 % - 69%	F – Failure

Attendance:

The COM-FSM attendance policy will apply.