

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

Course Outline Cover Page

Naval Architecture and Ship Construction

Course Title

ME 225

Department and Number

Course Description: This course will provide the student with the knowledge and skills required to recognize common terminology; identify basic stability requirements on small vessels; calculate fuel consumption and storage requirements on vessels; and operate, maintain, and repair components of the ship structure.

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 |
| Total Semester Credits: | | | | 3 |

Purpose of Course

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|----------------------|--------------|
| Degree Requirement | _____XX_____ |
| Degree Elective | _____ |
| Advanced Certificate | _____ |
| Certificate | _____ |
| Remedial | _____ |
| Other (Workshop) | _____ |

Prerequisite Course(s): ME 179 Practical Mathematics_____
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 recognize common terminology; identify basic stability requirements on small vessels; calculate fuel consumption and storage requirements on vessels; and operate, maintain, and repair components of the ship structure.

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

1. Determine the basic principles involved in small vessel design and construction.
2. Determine the fundamental stability principles and terms associated with the safe operation of a vessel.
3. Determine the effect of free surface, bilging and alterations on the stability of a vessel.
4. Determine the effect of the movement of weight on the stability of a vessel.
5. Determine the consumption of fuel oil for a voyage in accordance with established procedure and safe practices.
6. Manage the survey and maintenance of major structural components of small vessels.

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. Terminology
 - Registered length, length between perpendiculars, and length overall
 - Molded and extreme breadth
 - Molded depth
 - Draught and freeboard,
 - Camber
 - Sheer
 - Rise of floor
 - Bilge radius
 - Tumble home
 - Block coefficient
 - Displacement and displacement volume
 - Lightship and deadweight
 - Tonnes per centimeter immersion.

2. Stability

- Centers of buoyancy and gravity
- KG, KB, and GM
- Equilibrium conditions
- Slack tanks and water on decks
- Bilging
- Loading, unloading and lifting heavy loads
- Structural changes
- List and trim

3. Fuel and Lubricating oil consumption

- Time, distance, and speed
- RFC
- Fuel consumption
- Reserve
- Fuel order
- Variation with speed
- Voyage deviations

4. Ship Construction

- Framing systems
- Double bottoms
- Fore and aft construction
- Rudder, including pintle, stock and bearing
- Watertight integrity
- Bulkheads
- Watertight doors
- Ship side valves and fittings
- Material
- Maintenance
- Repair
- Survey

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

Learning Outcome 1 **Determine the basic principles involved in small vessel design and construction.**

Assessment criteria

1.1 Common terms used in relation to principal dimensions and components of small vessels are explained.

1.2 The terms displacement volume and block coefficient are described and related simple problems solved.

| | | |
|-------------------------------------|-----|---|
| | 1.3 | Archimedes' Principle is defined and related simple problems solved. |
| 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 |
| Learning Outcome 2 | | Determine the fundamental stability principles and terms associated with the safe operation of a vessel. |
| Assessment criteria | 2.1 | The terms commonly used in relation to stability, including: <ul style="list-style-type: none"> • Centre of buoyancy; • Centre of gravity; and • Metacenter; are defined. |
| | 2.2 | The relative positions of the above with respect to the keel, (KM, KB, KG, and GM), and the righting lever are defined. |
| | 2.3 | Conditions of stable, neutral and unstable equilibrium are described. |
| 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 |
| Learning Outcome 3 | | Determine the effect of free surface, bilging and alterations on the stability of a vessel. |
| Assessment criteria | 3.1 | Effects of slack tanks on a vessel's stability are described. |
| | 3.2 | Safe working practices to reduce free surface effect are explained. |
| | 3.3 | The effect on the stability of a vessel that has been bilged is described. |
| | 3.2 | Precautions required when making alterations to a vessel that may effect stability are explained. |

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| 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 |
| Learning Outcome 4 | Determine the effect of the movement of weight on the stability of a vessel. |
| Assessment criteria | <p>4.1 Effects of adding, removing, and shifting weights on the centre of gravity, centre of flotation, draft, trim, stability are explained.</p> <p>4.2 Effects on stability when vessel's gear is used to handle weights are described.</p> <p>4.3 Effects of heel and list on the stability of the vessels are explained.</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 |
| Learning Outcome 5 | Determine the consumption of fuel oil for a voyage in accordance with established procedure and safe practices. |
| Assessment criteria | <p>5.1 The Rates of Fuel Consumption of the vessel are calculated.</p> <p>5.2 The consumption of fuel quantities in liters is calculated.</p> <p>5.3 Fuel oil orders considering appropriate reserves and fuel on board are calculated</p> <p>5.4 Steaming time and range based on fuel on board are calculated.</p> <p>5.5 Effects of vessel speed and power on the rate of fuel consumption and the fuel requirement are explained and calculated.</p> <p>5.6 Fuel and voyage requirements based on voyage deviations are calculated.</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

Learning Outcome 6**Manage the survey and maintenance of major structural components of small vessels.**

Assessment criteria

- 6.1 Major structural components and their arrangements of small vessels are identified.
- 6.2 The affects of various sea conditions on the vessels structure are explained.
- 6.3 Arrangement, maintenance, and repair of:
- Structural components;
 - Ship side fittings, (including valves, strainers, scuppers); and
 - Rudders, (including pintle, stock, and bearings)
- in accordance with established practices, safe stress limits, and statutory requirements are described.
- 6.4 Survey requirements of the above items are identified.

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

Delivery strategy

The module provides for delivery by on-the-job and off-the-job training and assessment.

Some areas of content may be common to more than one learning outcome, and therefore integration of training and assessment may be appropriate.

Methods of instruction includes:

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.

Resource requirements

Delivery of the training will require:

- Classroom
- Whiteboard
- Overhead projector (or equivalent)
- Video player
- Access to an appropriate vessels
- Appropriate models
- Appropriate tools and safety equipment.

Assessment Strategy

Assessment Method

Knowledge based criteria will be satisfied through a combination of calculations, written and oral assessments.
Skill based criteria will be satisfied through practical exercises.

Condition of Assessment

This module may be assessed on and off the job. Competence may be assessed in the following situations: classroom; laboratories; and appropriate vessels.

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.