

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

**Course Outline Cover Page**

**Small Vessel Stability**  
Course Title

**MM 175**  
Department and Number

**Course Description:** To provide the learner with the knowledge and skills required to manage the stability related requirements of a vessel of less than 80 gross tons.

**Prepared by:** Brent Villiers

**State:** FSM-FMI

	Hours per Week	No. Of Weeks	Total Hours	Semester Credits
Lecture	2/4/8	4/2/1	8	0.5
Laboratory	24/12/6	2/4/8	48	1
Total Semester Credits:				1.5

**Purpose of Course**

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

**Prerequisite Course(s):** Nil

\_\_\_\_\_  
**Signature, Chairman, Curriculum Committee**

\_\_\_\_\_  
**Date Approved by Committee**

\_\_\_\_\_  
**Signature, President, COM-FSM**

\_\_\_\_\_  
**Date Approved by the President**

**General Objective:** To provide the learner with the knowledge and skills required to manage the stability related requirements of a vessel of less than 80 gross tons.

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

1. Apply fundamental stability principles to the safe operation of a vessel.
2. Load, discharge and shift weights safely on a vessel.
3. Take appropriate actions to counteract adverse effects on stability.
4. Use the information contained in a vessel's Simplified Stability Data to ensure the safe operation of the vessel.

***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. Basic Principles
  - Terms and definitions
  - Principle of flotation
  - Density
  - Use of displacement and TPC scales
  - Equilibrium
  - GZ curve
  - Load lines.
2. Effect of Weights
  - Effect of adding, removing and shifting weights on the centre of gravity, centre of flotation, draft, trim, and stability
  - List
  - Use of vessel's gear.
3. Factors affecting stability
  - Free surface effect
  - Angle of loll
  - Structural changes
  - Bilging
  - Stability in seaway.

## 4. Stability Data

- Use of simplified stability data without calculations.

**Learning Outcomes:**

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

**Learning Outcome 1**

**Apply fundamental stability principles to the safe operation of a vessel.**

- 1.1 Meaning of terms commonly used in relation to stability is explained.
- 1.2 Principle of flotation is described.
- 1.3 Relationship between mass, volume, weight, and buoyancy is described.
- 1.4 Effect of density on draft and displacement is described.
- 1.5 Weight of cargo or ballast is determined using displacement and TPC tables.
- 1.6 Conditions of stable, unstable, and neutral equilibrium are described.
- 1.7 Significance of GZ curve as a measure of the vessel's stability is explained.
- 1.8 Basic Loadline requirements are described.

## Conditions

This module may be assessed on-the-job and off-the-job. Competence may be assessed in the following situations: a vessel under survey; approved training vessel/facility; approved equipment laboratory; approved simulator facility.

## Assessment Method

- written test involving the use of sketching, diagram interpretation, short answer questions, multiple choice questions; simple calculations.
- Oral questioning
- Observation during practical exercises.

**Learning Outcome 2**

**Load, discharge and shift weights safely on a vessel.**

## Assessment criteria

- 2.1 Effect of adding, removing and shifting weights on the centre of gravity, centre of flotation, draft, trim, and stability is explained.

- 2.2 Effect on stability when vessel's gear is used to handle weights is described.
- 2.3 Effect of heel and list on the stability of the vessel is explained

## Conditions

This module may be assessed on-the-job and off-the-job. Competence may be assessed in the following situations: a vessel under survey; approved training vessel/facility; approved equipment laboratory; approved simulator facility.

## Assessment Method

- written test involving the use of sketching, diagram interpretation, short answer questions, multiple choice questions;
- oral questioning;
- observation during practical exercises.

**Learning Outcome 3****Take appropriate actions to counteract adverse effects on stability.**

## Assessment criteria

- 3.1 Causes and effects of free surfaces on the stability of a vessel are described.
- 3.2 Described safe working practices to reduce free surface effects are appropriate.
- 3.3 Difference between list and angle of loll is explained.
- 3.4 Described actions taken to correct an angle of loll are appropriate.
- 3.5 Effect of water on deck on the stability of a small vessel and the means of reducing that effect are described.
- 3.6 The effect on the stability of a vessel that has been "bilged" is described.
- 3.7 Described actions to contain flooding in the event of underwater damage to the hull are appropriate.
- 3.8 Precautions required when making alterations to a vessel that may affect stability are explained.
- 3.9 Situations that could cause a vessel to capsize are recognized and actions to minimize the risk are described.

## Conditions

This module may be assessed on-the-job and off-the-job. Competence may be assessed in the following situations: a vessel under survey;

approved training vessel/facility; approved equipment laboratory; approved simulator facility.

Assessment Method

- written test involving the use of sketching, diagram interpretation, short answer questions, multiple choice questions
- oral questioning;
- observation during practical exercises.

**Learning Outcome 4**

**Use the information contained in a vessel's Simplified Stability Data to ensure the safe operation of the vessel.**

Assessment criteria

- 4.1 Information contained in simplified stability data supplied to a small vessel is described.
- 4.2 Information provided by simplified stability data is interpreted correctly.
- 4.3 Described safe practices for operating the vessel are in accordance with the supplied information.

Conditions

This module may be assessed on-the-job and off-the-job. Competence may be assessed in the following situations: a vessel under survey; approved training vessel/facility; approved equipment laboratory; approved simulator facility.

Assessment Method

- written test involving the use of sketching, diagram interpretation, short answer questions, multiple choice questions;
- oral questioning;
- observation during practical exercises.

**Delivery strategy**

This module provides for off-the-job delivery in a classroom, supported by simulation and/or laboratory equipment and access to a vessel in survey.

**Resource requirements**

Delivery of this module will require :

- A suitable theory teaching space
- Simulation and/or laboratory equipment
- Vessel in survey
- Simplified stability data.

**Assessment Strategy**

Assessment Method	Knowledge, skills and attitudes may be measured by using a combination of practical exercises, oral assessment, and written tests.
Condition of assessment	This course may be assessed on-the-job and off-the-job. Competence may be assessed in the following situations: a vessel under survey; approved training vessel/facility; approved equipment laboratory; approved simulator facility.

**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.