

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

**Course Outline Cover Page**

**Navigation and Position Determination**

Course Title

**MM 177**

Department and Number

**Course Description:** To provide the student with the knowledge and skills in navigation and position determination required to plan and conduct the coastal passage of a vessel of up to 80 gross tons at the management level.

**Prepared by:** Brent Villiers

**State:** FSM-FMI

	Hours per Week	No. Of Weeks	Total Hours	Semester Credits
Lecture	8/16/32	4/2/1	32	2
Laboratory	6/12/24	16/8/4	96	2

Total Semester Credits: 4

**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 in navigation & position determination required to plan and conduct the coastal passage of a vessel of up to 80 gross tons at the management level.

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

1. Use and maintain navigational charts and other publications in accordance with established practice and statutory requirements.
2. Determine compass error and apply appropriate corrections to courses and bearings.
3. Determine the position of the vessel by observations of terrestrial objects.
4. Determine the position of the vessel taking into account the vessel's speed and the effects of tide, wind and current, and make appropriate allowances for such effects.
5. Extract and interpret basic tidal information from Tide Tables and navigational charts.
6. Plan and conduct a safe coastal passage.

***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. Charts and Publications
  - Information in admiralty charts & publications
  - Updating charts & publications
  - Basic Plotting techniques.
2. Compass Error
  - Compass, magnetic, true & relative courses & bearings
  - Variation & deviation
  - Deviation card
  - Gyro error.

3. Position Determination
  - Position lines
  - Position fixing.
4. Set, Drift & Leeway
  - Speed, time and distance calculations
  - Dead reckoning
  - Effects of currents, tidal streams & leeway
  - Estimated position
  - Course to steer to allow for set, drift and leeway.
5. Tides
  - Terminology
  - Interpretation of tidal information
  - Calculation of HW & LW at secondary ports
  - Tidal streams.
6. Voyage Planning
  - Sources of information
  - Factors taken into account
  - Identification of hazards
  - Preparation of voyage plan
  - Execution and monitoring of voyage plan.
7. Electronic navigational aids
  - Use of GPS and DGPS
  - Use of chart plotters
  - Use of electronic charts
  - Precautions in the use of electronic navigational aids.

**Learning Outcomes:**

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

**Learning Outcome 1**

**Use and maintain navigational charts and other publications in accordance with established practice and statutory requirements.**

- 1.1 Purpose and uses of navigational charts & publications are described.
- 1.2 Information obtained from charts is interpreted correctly.
- 1.3 Given the latitude and longitude of a place, the ability to plot the position on the chart is demonstrated.

- 1.4 Ability to plot a safe course between two positions is demonstrated.
- 1.5 Sources of information relating to upkeep of charts and publications are identified.
- 1.6 Contents of official notices to mariners are listed.
- 1.7 Chart correction procedure is demonstrated.
- 1.8 Updating/Correction procedures for navigational publications 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, chart work exercises, calculations, short answer questions, assignments
- Oral questioning
- Observation during practical exercises.

**Learning Outcome 2**

**Maintain a vessel's watertight integrity in accordance with established practice and statutory requirements.**

Assessment criteria

- 2.1 Meaning of the terms 'watertight' and 'weathertight' is explained.
- 2.2 Effects of loss of watertight integrity are explained.
- 2.3 Requirements for watertight subdivision in accordance with the South Pacific Maritime Code are outlined.
- 2.4 Maintenance and survey requirements to maintain watertight integrity 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 3**

#### **Determine the position of the vessel by observations of terrestrial objects.**

##### Assessment criteria

Vessel's position is determined using position lines obtained from any combination of simultaneous terrestrial observations including:

- 3.1 Visual bearings
- 3.2 Transit bearings
- 3.3 Radar Ranges
- 3.4 Radar Bearings
- 3.5 Depth sounder readings

##### 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, chartwork exercises, calculations, short answer questions, assignments;
- oral questioning;
- observation during practical exercises.

### **Learning Outcome 4**

#### **Determine the position of the vessel taking into account the vessel's speed and the effects of tide, wind and current, and make appropriate allowances for such effects.**

##### Assessment criteria

- 4.1 Relationship between speed, time and distance is described.
- 4.2 Given the vessel's speed and steaming time, the vessel's position is determined by Dead Reckoning.
- 4.3 Given set, drift and leeway information, the vessel's Estimated Position is determined.
- 4.4 Vessel's course and speed made good under the influence of currents, tides, and wind are determined.
- 4.5 Amount of set and drift is determined using plotting techniques.

- 4.6 Course to steer to counteract the effects of currents, tidal streams, and wind is determined using plotting techniques.

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	<ul style="list-style-type: none"><li>• written test involving the use of sketching, diagram interpretation, chartwork exercises, calculations, short answer questions, assignments;</li><li>• oral questioning;</li><li>• observation during practical exercises.</li></ul>
<b>Learning Outcome 5</b>	<b>Extract and interpret basic tidal information from Tide Tables and navigational charts.</b>
Assessment criteria	<p>5.1 Relationship between chart datum, height of tide, charted depth and available depth of water is explained.</p> <p>5.2 Meaning of terms commonly used in relation to tides is explained.</p> <p>5.3 Heights and times of High Water and Low Water at standard ports are extracted.</p> <p>5.4 Heights and times of High Water and Low Water at secondary ports are calculated.</p> <p>5.5 Approximate direction and strength of tidal streams is determined from information available on navigational charts.</p>
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	<ul style="list-style-type: none"><li>• written test involving the use of sketching, diagram interpretation, short answer questions, multiple choice questions;</li><li>• oral questioning;</li><li>• observation during practical exercises.</li></ul>

<b>Learning Outcome 6</b>	<b>Plan and conduct a safe coastal passage.</b>
Assessment criteria	<p>6.1 Sources for obtaining necessary information for planning a voyage are identified and their use explained.</p> <p>6.2 Appropriate charts and publications are selected for the intended voyage.</p> <p>6.3 Factors to be taken into account in determining a safe route in close proximity to the coast are described.</p> <p>6.4 Hazards to navigation along the proposed route are identified.</p> <p>6.5 Voyage plan is prepared in accordance with established practice.</p> <p>6.6 Factors to be taken into account in the execution and monitoring of the voyage plan are described.</p>
Conditions	<p>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.</p>
Assessment Method	<ul style="list-style-type: none"><li>• written test involving the use of sketching, diagram interpretation, short answer questions, multiple choice questions;</li><li>• oral questioning;</li><li>• observation during practical exercises.</li></ul>
<b>Learning Outcome 7</b>	<b>Use electronic navigational equipment fitted on board for navigation and position determination.</b>
Assessment criteria	<p>7.1 Use of GPS and DGPS is described.</p> <p>7.2 Use of GPS interfaced plotters is described.</p> <p>7.3 Use of electronic charts is described.</p> <p>7.4 Precautions to be observed when using GPS and electronic charts are described.</p>
Conditions	<p>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.</p>

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 course will require:

- A suitable theory teaching space
- Simulation and/or laboratory equipment
- Vessel in survey
- Suitable navigational charts and publications
- Electronic navigational equipment

**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.