College of Micronesia – FSM
P.O. Box 159
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Course Outline Cover Page

Practical Mathematics — Course Title
ME 178 — Department and Number

Course Description: To provide the learner with the knowledge and skills required for calculating fuel consumption and storage requirements on vessels and solving basic engineering problems.

Prepared by: Brent Villiers **State:** FSM-FMI

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

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 for calculating fuel consumption and storage requirements on vessels and solving basic engineering problems.

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

1. Using a calculator, solve calculations involving addition, subtraction, multiplication, and division.
2. Using a calculator, solve calculations involving fractions, decimals, indices, and percentages.
3. Solve simple formulae by transposition.
4. Determine the area and volume of basic shapes in accordance with established procedure.
5. Determine the mass of regular shapes and tank contents in accordance with established procedure.
6. Determine the consumption of fuel and lubricating oil for a voyage in accordance with established procedure and safe practices.

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 Calculations
   - Addition
   - Subtraction
   - Multiplication
   - Division
   - Fractions
   - Decimals
   - Indices

2. Formulae
   - Transposition
   - Solution

3. Areas and Volumes
   - Rectangles
   - Triangles
   - Circles

- Volumes having an uniform cross sectional area
- Partially filled tanks

4. Mass and Weight
   - Density
   - Relative density (specific gravity)

5. Fuel and Lubricating Oil Consumption
   - Speed
   - Distance
   - Time
   - Rates of Fuel and Lubricating Oil consumption
   - Voyage requirements
   - Reserve
   - Fuel order

Learning Outcomes

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

Learning Outcome 1

Using a calculator, solve calculations involving addition, subtraction, multiplication, and division.

Assessment Criteria

1.1 Problems consisting of a combination of addition, subtraction, multiplication, and division are solved.
1.2 Problems consisting of positive and negative numbers are solved.

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

Learning Outcome 2

Using a calculator, solve calculations involving fractions, decimals, indices, and percentages.

Assessment Criteria

2.1 Fraction and decimals are defined.
2.2 Fractions are converted to decimals.
2.3 Indices are defined and solved.
2.4 Percentages are defined and solved.
2.5 Problems involving fractions and decimals consisting of a combination of

addition, subtraction, multiplication, and division are solved.

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

Learning Outcome 3 **Solve simple formulae by transposition.**

Assessment Criteria

3.1 Equations specific to addition, subtraction, multiplication, and division are transposed and solved.

3.2 Equations consisting of a combination of addition, subtraction, multiplication, and division are transposed and solved.

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

Learning Outcome 4 **Determine the area and volume of basic shapes in accordance with established procedure.**

Assessment Criteria

4.1 Shapes on board vessels related to the basic areas and volumes are identified.

4.2 The area of rectangles, triangles, and circles is calculated.

4.3 The volumes of shapes and tanks having a uniform cross sectional area of rectangles, triangles, and circles are calculated.

4.4 The circumference of a circle is calculated.

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 5 **Determine the mass of regular shapes and tank contents in accordance with established procedure.**

Assessment Criteria

5.1 The terms mass, weight, density, and relative density (specific gravity) are defined.

5.2 The relationship between volume and mass is defined.

5.3 The relationship between mass and weight is identified.

5.4 The mass of regular shapes and contents in tanks having a uniform cross sectional area of rectangles, triangles, and circles is calculated.

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 6 Determine the consumption of fuel and lubricating oil for a voyage in accordance with established procedure and safe practices.

Assessment Criteria

6.1 The Rates of Fuel and Lubricating Oil Consumption of the vessel are defined, and their limitations explained.

6.2 The consumption of fuel and lubricating oil quantities in liters is calculated.

6.3 Fuel and lubricating oil orders considering appropriate reserves and fuel on board are calculated.

6.4 Steaming time and range based on fuel on board are calculated.

6.5 Effects of vessel speed and power on the Rate of Fuel Consumption and the fuel requirement are explained.

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

Delivery strategy

The module provides for delivery by on 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. Calculation via examples and tutorials; and
3. Practical demonstrations.

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.

Conditions 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.

Resource Requirements:

- Classroom
- Whiteboard
- Overhead projector (or equivalent)
- Access to appropriate vessels or models.

Reference Materials:

SPC 051 Practical Mathematics Learners Guide

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.