

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

Course Outline Cover Page

Basic Radar Operations
Course Title

MME 162
Department and Number

Course Description: To develop the knowledge and skills necessary to enable the student to be able to operate radar installations on board fishing and merchant vessels.

Prepared by: Brent Villiers

State: FSM-FMI

	Hours per Week	No. Of Weeks	Total Hours	Semester
Credits				
Lecture	2/4/8/16	8/4/2/1	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): Safety Certificate

Signature, Chairman, Curriculum Committee

Date Approved by Committee

Signature, President, COM-FSM

Date Approved by the President

General Objective: In addition to meeting COM-FSM's Certificate of Achievement criteria, this course is targeted at students and mariners who wish to obtain a Certificate of Competency as Master Grade 6 in accordance with the South Pacific Maritime Code. This course covers part of the syllabus requirements as described in the code and on successful completion of this course the student will be able to operate radar installations on board fishing and merchant vessels.

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

1. Describe the basic principles of operation of radar set used in small craft.
2. Describe the factors that affect detection and presentation of a target on a radar display.
3. Set up and maintain the picture on a radar set typical of the type installed on small commercial vessels.
4. Interpret a radar display.
5. Use radar as an aid to navigation.
6. Apply the information obtained by radar for collision avoidance.

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. Fundamentals of radar
 - Basic operation principles
 - Identification of controls
2. Setting up and maintaining displays
 - Start up checks
 - Correct use of controls
3. Display interpretation
 - Recognition of targets
 - Sea clutter
 - Rain clutter
4. Using radar for navigation
 - Range and bearing
 - Identification of critical echoes
 - Position fixes
5. Using radar for collision avoidance
 - Determination of relative tracks
 - Time and distance of closest approach

Learning Outcomes:	On completion of this course the learner will be able to:
Learning Outcome 1	Describe the basic principles of operation of radar set used in small craft.
Assessment criteria	<ol style="list-style-type: none"> 1.1 The main components of a marine radar set are identified. 1.2 The fundamentals of radar theory are explained. 1.3 The factors to be considered during installation of radar equipment are stated.
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 • Oral assessment
Learning Outcome 2	Describe the factors that affect detection and presentation of a target on a radar display.
Assessment criteria	<ol style="list-style-type: none"> 2.1 Factors affecting minimum and maximum radar ranges are described. 2.2 Factors affecting bearing and range discrimination are described 2.3 The effect of weather conditions on radar performance and accuracy are described. 2.4 The effect of a target's characteristics have on its reflecting properties is explained. 2.5 The causes of blind arcs and sectors are identified. 2.6 The effects of blind arcs and shadow sectors or target detection and display are described
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 • Oral assessment • Practical assessment
Learning Outcome 3	Set up and maintain the picture on a radar set typical of the type installed on small commercial vessels.
Assessment criteria	<ol style="list-style-type: none"> 3.1 The physical and radiation hazards of live radar equipment are explained.

	3.2	Radar display controls are identified.
	3.3	The operation of radar controls is demonstrated.
	3.4	Pre operational checks for radar operation are listed.
	3.5	The correct sequence for switching on a radar set is demonstrated.
	3.6	A radar set is tuned correctly and an optimum display picture is maintained.
	3.7	The importance of regular checks of display performance is discussed.
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 • Oral assessment • Observation during practical sessions on a radar set.

Learning Outcome 4**Interpret a radar display.**

Assessment criteria	4.1	Fixed targets are identified on a radar display.
	4.2	Moving targets are identified on a radar display.
	4.3	Sea clutter is identified on a radar display.
	4.4	Rain clutter is identified on a radar display.
	4.5	Side lobe echoes are identified on a radar display.
	4.6	Indirect echoes are identified on a radar display.
	4.7	Multiple echoes are identified on a radar display.
	4.8	The effects of second set interference are identified on a radar set.
	4.9	Blind arcs and shadow sectors are identified on a radar display
	4.10	The nature of second trace echoes is 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 • Oral assessment

- Observation during practical sessions using a radar set.

Learning Outcome 5**Use radar as an aid to navigation.**

Assessment criteria

- 5.1 The radar picture will be correlated correctly with navigational chart information.
- 5.2 The method of checking the accuracy of variable range marker is demonstrated.
- 5.3 Radar ranges and bearings are used to fix a vessel's position.
- 5.4 The hazards associated with fixes by radar bearings alone are discussed.
- 5.2 The importance of using visual means for checking radar positions is discussed.

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
 - Oral assessment
 - Observation during practical sessions using a radar set.

Learning Outcome 6**Apply the information obtained by radar for collision avoidance.**

Assessment criteria

- 6.1 The importance of the early use of radar at night or during deteriorating visibility conditions is discussed
- 6.2 Systematic radar observations are used to determine the relative movement of targets.
- 6.3 The relative movement of targets is used to determine the closest point of approach.
- 6.4 The importance of frequent recording of range and bearing of radar targets as an aid to collision avoidance is stated.
- 6.5 The content of rules 5, 6 and 7 outlined.
- 6.6 The content of rule 19 is correctly applied.

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 • Oral assessment • Practical assessment using a radar set or radar simulator.
<u>Delivery strategy</u>	<p>The course provides for delivery by on or off-the-job training and assessment utilizing facilities that simulate conditions found on board merchant and small commercial vessels.</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 should include:</p> <ol style="list-style-type: none"> 1. Classroom instruction; 2. Instructor demonstrations; 3. Participation in practical exercises; 4. Group work and 5. Simulations
<u>Resource requirements</u>	<p>Delivery of the training will require:</p> <ul style="list-style-type: none"> • Classroom • Overhead projector • Video and monitor • Radar set and or simulator • Radar plotting equipment • Copies of the International Rules for the Prevention of Collisions at Sea • Learners guides
<u>Assessment Strategy</u>	<p>Assessment Method</p> <p>Learning outcomes may not be assessed separately. A holistic assessment strategy is proposed that an attempt to ensure as much as possible that the assessment replicates conditions that learners may encounter in their workplace.</p> <p>Practical assessment will be undertaken by observing the ability of learners to correctly apply the techniques taught in the module.</p>

Condition of Assessment Assessment may take place on or off-the-job.
Where assessment is conducted off-the-job, the
environment, where possible will simulate the
real work place situation.

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.