Outline

Outboard Cooling System — Course Title
SE124 — Dept. & Course No.

I. COURSE DESCRIPTION:
This course covers the principles of operation of outboard cooling system, trouble-shooting of cooling systems and the service, maintenance, removal, repair and re-installation of all cooling system components.

II. SEMESTER CREDITS: 2

III. CONTACT HOURS PER WEEK: 2 Lec 3 Lab 5 Total

IV. PREREQUISITES: SE112 & SE113

V. STUDENT LEARNING OUTCOMES:

Upon the completion of the course, the students will be able with 65% accuracy to:

1. Explain how the water cooling system of an outboard works.
2. Remove, repair, and reinstall all components of the water cooling system.
3. Test-run the water cooling system.
4. Explain and demonstrate service, repair and maintenance of an outboard cooling system.

VI. COURSE CONTENTS:

A. Cooling System
   1. Water pump housing
   2. Wet sleeve housing
   3. Impeller pump
   4. Water intake
   5. Water jacket
   6. Thermostat
   7. Water tube

B. Service, Repair & Maintenance
   1. Water channels
   2. Pump inlet port
   3. Pump outlet port
   4. Water indicator

VII. MATERIALS AND EQUIPMENT
A. Outboard Engine of any kind
B. 2 hp – 275 hp
C. Impeller housing
D. Impeller (Synthetic rubber)
E. Sealant (Form a gasket type)
F. Impeller key

VIII. TEXTS

Required Text(s)

Roth, Alfred C. Small Gas Engines. South Holland, Illinois. The Goodheart-Wilcox, 2012.

IX. METHOD OF INSTRUCTION

A. Lecture
B. Guest speakers
C. Laboratory work
D. Audio/Visual
E. Demonstration/discussion
F. Individualized instruction
G. Reinforcement/enrichment activities

X. METHOD OF EVALUATION

The components with corresponding weight in percent included in the computation of the total grade:

Final Exam	15%
Mid-term	15%
Tests and homework	20%
Projects	50%
Total	100%

Transmutation of percent to letter grade is as follows:

90 – 100 = A
80 - 89 = B
70 - 79 = C
65 - 69 = D
0 - 64 = F

TASKS

SE124 Outboard Cooling System — **Credits:** 2 (Lec) 1 (Lab) 48 (Ttl. Lab Hrs)
Course No. & Title

SLO #1-3 — 24 hrs

1. Remove and install water pump housing
2. Remove & install water pump key
3. Replace worn parts of entire cooling system
4. Service water jackets
5. Replace water intake if damage & service
6. Replace worn parts and test run
7. Service and test thermostat

SLO #4 — 24 hrs

1. Open and inspect water channels for wear, blockages and faults
2. Repair and service water pump inlet port
3. Repair and service water pump outlet port
4. Remove and clean the screen in a lower unit

Palau Community College
SE124 Outboard Cooling Systems
Course Learning Outcomes

During the course experience, the ***course learning outcomes*** (CLOs) will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical ratings of 4, 3, 2 and 1 are not intended to represent the traditional school grading system of A, B, C, D and F. The descriptions associated with each of the numbers focus on the level of student performance for each of the course learning outcomes listed below.

Rating Scale: 4 Outstanding
3 Proficient
2 Developing
1 Emerging

Course Learning Outcome 1: Students will be able to identify every part of an outboard cooling system and explain how it works.

Outstanding 4	Demonstrates full knowledge and understanding and can explain how outboard cooling systems work. Can identify all major components of the cooling system. Can confidently explain the theory and principle of operation of an outboard cooling system.
Proficient 3	Demonstrates fair knowledge and understanding and can explain how outboard cooling systems work. With fair knowledge and understanding, can identify most major components of the cooling system and explain the theory and principle of operation of an outboard cooling system.
Developing 2	Understands and can explain many aspects of an outboard cooling system. Can identify some major components of the cooling system and explain the theory and principle of operation of an outboard cooling system with help from an instructor.
Emerging 1	Understands some aspects of an outboard cooling system. Can identify only the major components of the cooling system.

Course Learning Outcome 2: Students will be able to service, maintain and repair a faulty cooling system.

Outstanding 4	Demonstrates full knowledge and understanding of how an outboard cooling system works and can confidently troubleshoot and repair all aspects of the system. Can confidently service and maintain all components of an outboard cooling system without supervision.
Proficient 3	Demonstrates fair knowledge and understanding of how an outboard cooling system works and can troubleshoot and repair all aspects of the system. With fair knowledge and understanding, can service and maintain all components of an outboard cooling system without supervision.
Developing 2	Understands how an outboard cooling system works and can troubleshoot and repair some aspects of the system. Can service and maintain some components of an outboard cooling system with supervision.
Emerging 1	Understands how an outboard cooling system works and can assist an instructor to troubleshoot and repair all aspects of the system.