

Outline

Basic Engine Principles
Course Title

SE112
Dept. & Course No.

I. COURSE DESCRIPTION:

This course covers principles of theory and operation and skills relating to repair and maintenance of basic outboard marine engines.

II. SEMESTER CREDITS: 3

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

IV. PREREQUISITES: None

V. STUDENT LEARNING OUTCOMES:

VI. COURSE CONTENTS:

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

1. Explain theory & principles of both two and four cycle engines.
 2. Explain differences of power head components for different types of engines.
 3. Explain and demonstrate engine break-in procedures for two & four cycle engines.
 4. Demonstrate and explain lubrication points as well as oil changing.
- A. Two & Four Cycle Engine
 1. Intake-stroke
 2. Compression stroke
 3. Power stroke
 4. Exhaust stroke
 - B. Power Head
 1. Cylinder block
 2. C-shaft
 3. Piston
 4. Con-rod
 5. Piston pin
 6. Labyrinth ring
 - C. Break-In
 1. Fuel and oil ratio
 2. Number of hours
 3. Torque specs
 4. Oil changing & types oil
 - D. Lubrication
 1. Throttle linkage
 2. Bracket and swivel
 3. Cover latch
 4. Gear box oil change
 5. Type of gear case
 6. Types of oil

5. Demonstrate, explain & repair engine lost overboard. (submerged motor in salt water or fresh water).
- E. Submerged Motor
 1. Disassemble number power unit.
 2. Repair and replace internal components
 3. Overhaul every unit if necessary or replace

VII. MATERIALS AND EQUIMENTS

- A. Outboard engine of any kind
- B. 2hp – 275hp
- C. Impeller housing
- D. Impeller (synthetic rubber)
- E. Sealant (form a gasket type)
- F. Impeller key
- G. Routine classroom materials

VIII. TEXT(S)

Required Text(s)

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

IX. METHOD OF INSTRUCTION

- A. Lectures
- 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

TASK LIST

SE112 – Outboard Power Head Systems
Course No & Title

Credits: $\frac{2}{\text{Lec}}$ $\frac{1}{\text{Lab}}$ $\frac{48}{\text{Total Lab Hrs}}$

SLO #1		11 hrs
1. Remove and identify parts of power head		
2. Service, repair engine block		
3. Disassemble & Reassemble com-rod to wrist pin		
4. Reassembly of the entire unit		
SLO #2		
1. Remove and identify movement for each stroke sequences		11 hrs
2. Disassemble piston and the rod		
3. Identify piston for two & four cycle engines		
4. Remove, disassemble and service C-shaft for both two & four cycle engine		
SLO#3		11 hrs
1. Follow the right measurement and formula of mixing fuel and oil into the rights ratio		
2. Follow and apply number of hours required for break-in procedures, based on manufactures recommendations.		
3. Re-torque all necessary components required base on torque specifications		
4. Remove & drain the oil		
SLO #4		11 hrs
1. Disassemble, clean and repair		
2. Remove the spark plug and clean		
3. Disassemble & reassemble the fuel system		
SLO #5		4 hrs
1. Read and become familiar with the service manuals for the major engine types available in Palau		
2. Read and become familiar with the parts manuals for the major engine types available in Palau		

