



**Small Engine & Outboard Motor Technology**  
**Student Learning Outcome Mapping**  
**Course (CLO), Program (PLO), Institutional (ILO)**

**Program Description:** This program is designed to provide students with technical knowledge, skills and proper work habits/attitudes necessary for employment in this field. The program prepares students to work and advance in their careers as mechanics, troubleshooters, parts counter salespersons, or operators of their own small engine service and repair shops.

Program Learning Outcomes	Institutional Learning Outcomes
<ol style="list-style-type: none"> <li>1. Students will be employable in the field of Small Engine and Outboard Marine Technology.</li> <li>2. Students will demonstrate skills in diagram reading and testing.</li> <li>3. Students will demonstrate skills in boat fitting and rigging.</li> <li>4. Students will be able to manage and operate their own service shop.</li> <li>5. Students will demonstrate skills in diagnosing and repairing small engines and outboard motors.</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Critical Thinking and Problem Solving:</b> Analyze and solve problems by using informed judgment based on evidence, sound reasoning, and/or creativity to differentiate facts from opinions and to specify solutions and their consequences.</li> <li>2. <b>Communication:</b> Effectively communicate, both orally and in writing, thoughts in a clear, well-organized manner to persuade, inform and/or convey ideas in academic, work, family and community settings.</li> <li>3. <b>Quantitative and Technological Competence:</b> Use mathematical skills appropriate to our technological society by analyzing and solving problems that are quantitative in nature and use technology for informational, academic, personal and professional needs.</li> <li>4. <b>Diversity:</b> Understand and appreciate differences in cultures and behaviors between the self and others by demonstrating respect, honesty, fairness, and ethical principles in both personal and professional life.</li> <li>5. <b>Civic Responsibility:</b> Apply the principles of civility and morality to situations in the contexts of a healthy family, work, community, environment and world.</li> <li>6. <b>Aesthetics:</b> Apply numerous means of inquiry to experience and appreciate the values of arts and nature.</li> </ol>

### PLO-ILO Mapping

PLOs	ILOs					
	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
PLO 1	X	X	X	X	X	X
PLO 2	X	X	X	X		
PLO 3	X	X	X	X		X
PLO 4	X	X	X	X	X	X
PLO 5	X	X	X	X		X

## CLO-PLO-ILO Mapping

### SE 101 - Boat Operation

This course is designed to familiarize students with safe operation of outboard motor boats including national safety measures, open water driving, boat and engine maintenance, proper approaches to water hazards and operator's rules of driving.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Explain and apply Palau and international boat safety precautions as they apply to small boats.	X						X	X	X		X	
2. Perform correct boat operation safety driving techniques.	X						X		X		X	
3. Maintain boat engines and hulls in a safe working condition.	X			X			X	X	X		X	

### SE 112 - Basic Engine Principles

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

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Service and repair an outboard engine powerhead.	X			X	X		X	X	X			
2. Understand outboard lubrication points and perform break-in procedures.	X			X	X		X	X	X			
3. Revive a submerged engine.	X			X	X		X	X	X			
4. Understand and use service manuals and parts catalogues.	X			X	X		X	X	X			

## SE 113 - Two and Four-Cycle Engines

This course covers overhaul and repair of lawn, garden, and recreational engines under shop conditions according to manufacturers' recommendations. It also includes rebuilding procedures on large, single, multi-cylinder and four cycle engines. Complete engine diagnosis and reconditioning practices are covered.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Recognize and name all major parts from both two and four-stroke engines.	X			X	X		X	X	X			
2. Recognize and explain differences between two and four-stroke engines.	X			X	X		X	X	X			
3. Explain tune-up and trouble-shooting techniques for two and four-stroke engines.	X			X	X		X	X	X			

## SE 122 - Outboard Engine Electrical System

This course covers the electrical system associated with marine engine including the charging circuit, starting circuit and ignition circuit. Theories of operation and maintenance/repair are discussed and applied.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Troubleshoot, test, repair electrical system.	X	X		X	X		X	X	X			
2. Troubleshoot, test, repair starter motor.	X	X		X	X		X	X	X			
3. Troubleshoot, test, repair alternator.	X	X		X	X		X	X	X			
4. Perform battery testing and servicing.	X	X		X	X		X	X	X			
5. Test, adjust, replace wire and switch.	X	X		X	X		X	X	X			

## SE 123 - Outboard Fuel & Carburetion Systems

This course covers functions, maintenance, service of fuel tanks, pumps, carburetors, intake manifolds, flame arresters, filters and fuel injection systems used in marine engines.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Identify and explain the operation of the components of an outboard fuel system.	X			X	X		X	X	X			
2. Remove service and reinstall all components in an outboard fuel system.	X			X	X		X	X	X			
3. Trouble-shoot and repair all aspects of an outboard fuel system.	X			X	X		X	X	X			

## SE 124 - Outboard Cooling System

This course covers the principles of operation of outboard cooling system, troubleshooting of cooling systems and the service, maintenance, removal, repair and re-installation of all cooling system components.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Identify every part of an outboard cooling system and explain how it works.	X				X		X	X	X			
2. Service, maintain and repair a faulty cooling system.	X			X	X		X	X	X			

## SE 212 - Outboard Lower Unit System

This course covers principles of gear cases, power trim/tilt system, propellers and gear shifting system on a variety of outboard engines. The focus is on gear case designs, measurements, overhaul procedures and reconditioning of all parts in the modern outboard gear case. Students should be able to troubleshoot, service and rebuild outboard engine gear cases and power trim and tilt systems.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Carry out a full service of an outboard gear box as well as repair or replace any damaged parts.	X			X	X		X	X	X			
2. Demonstrate and explain how a power trim system works.	X				X		X	X	X			
3. Identify and describe various types of propellers as well as remove and refit them.	X				X		X	X	X			
4. Troubleshoot, service and repair the shifting systems for various outboards.	X			X	X		X	X	X			

## SE 213 - Outboard Power Head System

This course introduces power-head designs and functions on a variety of outboard makes and models. Topics include identifying complete outboard powerhead cylinder blocks, crank shafts, bearings, pistons and connecting rod assembly systems and techniques to test/troubleshoot power-head components. Students should be able to troubleshoot, test and rebuild powerhead systems with specific attention to parts identification, tolerance, inspection, assembly and installation.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Remove service and repair an outboard power head.	X			X	X		X	X	X			
2. Identify, inspect and check crankshafts, bearings, pistons and cylinder blocks.	X			X	X		X	X	X			

## SE 221 - General Laboratory

Advanced maintenance and repair skills are developed in all aspects of a real-life shop situation by applying skills from previously studied courses. It includes dealing with customer problems, shop practices and procedures, tune-up and troubleshooting techniques, and installing motors and accessories. Emphasis is placed on actual work situations.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Perform and demonstrate proper procedures for handling inventories and customers.	X			X			X	X	X	X	X	X
2. Perform general tune-up.	X			X	X		X	X	X			
3. Perform troubleshooting.	X			X	X		X	X	X			
4. Perform installing motors and accessories.	X		X	X	X		X	X	X			

## SE 222 - Diagram Reading and Testing

This is a continuation of SE 122. It covers small engine and outboard engine wiring diagrams and designs. It provides student with a practical approach to industrywide electrical testing, diagnostic and repair techniques using diagnostic charts, wiring diagrams, service manuals, and manufacturers repair procedures.

CLO Students will be able to:	PLO						ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5		ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
1. Perform service and repair electrical system.		X	X		X		X	X	X	X	X	X
2. Demonstrate the use of volts and ohms meter to test the entire system.	X	X	X		X		X	X	X	X	X	X
3. Use and understand wiring diagram.		X	X		X		X	X	X	X	X	X
4. Service testing and repair small gas engine wiring.		X	X		X		X	X	X	X	X	X
5. Use of diagnosis equipment.		X	X		X		X	X	X	X	X	X

## SE 223 – Internship

This course provides the student with practical training in outboard engine repair. With the assistance of an instructor-coordinator, the student is assigned to work under a supervisor in a governmental department or a private business in order to learn through actual work experience.

CLO	PLO					ILO					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
Students will be able to:											
1. Demonstrate proper employee behaviors and work habits.	X	X	X	X	X	X	X	X	X	X	X
2. Perform small engine and outboard motor repair tasks as assigned by a site supervisor.	X	X	X	X	X	X	X	X	X	X	X