# Automotive Technology Program 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 the field of automotive technology. The program prepares the students to work and advance in their careers in positions such as automotive mechanics and parts counter salespersons.

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| --- | --- |
| **Program Learning Outcomes** | **Institutional Learning Outcomes** |
| 1. Perform undercarriage servicing. 2. Perform engine servicing. 3. Perform automotive air conditioning and comfort heating servicing. 4. Perform power train servicing. | 1. **Critical Thinking and Problem Solving**: 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. 2. **Communication**: 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. 3. **Quantitative and Technological Competence**: 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. 4. **Diversity**: 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. 5. **Civic Responsibility**: Apply the principles of civility and morality to situations in the contexts of a healthy family, work, community, environment and world. 6. **Aesthetics**: Apply numerous means of inquiry to experience and appreciate the values of arts and nature. |

# PLO-ILO Mapping

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| --- | --- | --- | --- | --- | --- | --- |
| **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** | **X** | **X** |
| **PLO 3** | **X** | **X** | **X** | **X** | **X** | **X** |
| **PLO 4** | **X** | **X** | **X** | **X** | **X** | **X** |

**CLO-PLO-ILO Mapping**

**AT 101 - Vehicle Operation**

This course covers the knowledge, skills and attitude needed to operate light duty vehicles classified under Palau Public safety restriction code A to C and comply with local traffic rules and regulation. It also includes vehicle minor repairs and servicing on undercarriage components, power train lubrication, engine lubrication and engine cooling system, maintain automotive shop, tools, and equipment, and practice shop and occupational health safety.

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| **CLO**  Students will be able to: | **PLO** | | | | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Inspect under hood components. | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Inspect vehicle main components. | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Clean vehicle unit. | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Obey and observe traffic rules and regulation. |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Drive light duty vehicle. | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |

# AT111 - Drive Train Servicing

This course includes the knowledge, skills, and attitude needed to service power train components, such as servicing clutch system, servicing differential and front axle, and overhauling of manual transmission for both transaxle type and longitudinal type. It also includes troubleshooting of drive train noise and vibration.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service clutch system. |  | **X** |  |  |  | **X** |  | **X** |  |  |  |
| 2. Service longitudinal type manual transmission. |  | **X** |  |  |  | **X** |  | **X** |  |  |  |
| 3. Service front drive shaft. |  | **X** |  |  |  | **X** |  | **X** |  |  |  |
| 4. Service transversal type manual transmission  assembly. |  | **X** |  |  |  | **X** |  | **X** |  |  |  |
| 5. Service manual transmission transfer case. |  | **X** |  |  |  | **X** |  | **X** |  |  |  |
| 6. Service rear differential and drive axles. |  | **X** |  |  |  | **X** |  | **X** |  |  |  |

# AT 112 - Engine Servicing I

This is an introductory course covering the basic principle of an internal combustion engine for gas and diesel engine (four stroke and two stroke engine), and focuses on engine lubrication and cooling system servicing, engine tuning, adjusting idling speed, engine timing and fuel injection timing, for diesel engines.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Perform engine lubrication system preventive  maintenance. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Conduct engine cooling system preventive  maintenance. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service engine valve mechanism. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service carburetor assembly. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Perform engine tuning. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 113 - Basic Automotive Electricity and Electronics

This is an introductory course covering the basic principle of automotive electricity and electronic components for a vehicle equip with internal combustion engine using 12 or 24 DC volts. It also includes reading, interpreting electrical circuit diagram, and troubleshooting basic engine electrical and electronic problems.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service automotive battery. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service starting system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service charging system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service ignition system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Service engine electrical system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 6. Service diesel engine pre-heating system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 121 - Automotive Electricity

This course covers wiring installation of automotive electrical components, servicing of lighting system, servicing chassis electrical components, servicing automotive electrical security system, and servicing automotive sound system. It also includes reading, interpreting, and designing electrical circuit diagram and troubleshooting of electrical problem, such as faulty switch, short circuit, and open circuit.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service lighting system. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service chassis electrical system. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service electrical security system. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service automotive sound system. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Diagnose automotive electrical system. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 122 – Undercarriage Servicing

This course deals with servicing of suspension system, brake system, steering system, wheel alignment, underchassis preventive maintenance, troubleshooting of early worn-out tires, body vibration, and steering wheel maneuvering problems.

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| **CLO**  Students will be able to: | **PLO** | | | | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Perform suspension system servicing. |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Perform steering system servicing. |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Perform brake system servicing. |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Perform wheel alignment. |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Analyze underchassis problems. |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 125 – Automotive Technology Service Learning I

Automotive Technology Service Learning I is a method by which students learn through active participation in organized service conducted in the industry. Automotive Technology Service Learning I is integrated into and enhances the course and program learning outcomes. It includes structured means for critical thinking on service experience and helps to foster civic and career responsibility. This course allows students to practice the skills learned in servicing undercarriage components, but not limited to explore and learn other automotive skills throughout the duration of the time in the industry.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Demonstrate proper employee behavior and  work habits. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Perform automotive mechanic tasks as  assigned by a site supervisor. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |

**AT 126 - Engine Servicing II**

This course is designed to enhance the knowledge, skills, and attitude of an individual in servicing engine mechanical components, overhauling the engine and servicing of diesel injection pump and injectors. The tasks involve a complete dismantling and rebuilding of engine parts and components for both gasoline engine and diesel engines.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Troubleshoot engine mechanical failure. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service engine top end components. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service engine bottom end components. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service engine front end components. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Overhaul engine assembly. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 212 - Electronic Engine Management

This course covers the knowledge, skills and attitude required to service and repair electronic controlled fuel injection systems and their associated components for both diesel and gasoline engines. It also includes reading and interpreting engine electrical circuit diagrams and troubleshooting engine sensors, actuators, and power train control module (PCM) circuit problems.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service EFI (Electronic Fuel Injection) fuel  system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service Electronic Fuel injection (EFI) sensors. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service Electronic Fuel injection (EFI) actuators. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service Engine Computer Control Unit (OBD-1  capability). | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Analyze Electronic Engine Management problems. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 213 - Automotive Computer Control System

This course covers the knowledge, skills and attitude required to: install, test, and repair of engine computer controlled system such as; Electronic sensing device, computer controlled ignition system, computer controlled actuators, power train control module, and idle speed control. It also includes servicing of emission control components.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Run power train control module monitors to  completion. | **X** |  | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service electronic controlled ignition system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service power train control module (OBD-2  capability). | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service emission control system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Service computer controlled air induction  system. | **X** |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 221 - Automotive Air-conditioning and Comfort Heating

This course covers the knowledge, skills and attitude required to service and repair automotive comfort heating and air-conditioning system and their associated components for both fix orifice valve and thermostatic expansion valve. It also includes reading and interpreting air conditioning system electrical circuit diagram and troubleshooting comfort heating and air-con sensors, actuators, switches, and control module circuit problems.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service automotive comfort heating system. | **X** |  | **X** |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service automotive air-conditioning system. |  |  | **X** |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service air-con compressor and condensing  unit. |  |  | **X** |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service air duct and case system. |  |  | **X** |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Service automotive air-con electrical system. |  |  | **X** |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AM 222 - Automatic Transmission

This course is designed to enhance the knowledge, skills and attitude of an individual in servicing hydraulically operated automatic transmissions. It also includes overhauling of all automatic transmission gear boxes and valve body repair.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Inspect automatic transmission operating  performance. |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service gear box assembly. |  | **X** |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service valve body assembly. |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service automatic transmission solenoid valves. |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Service automatic transmission shifting linkage. |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 223 - Electronically Controlled Transmission

This course is designed to enhance the knowledge, skill and attitude of an individual in servicing electronic controlled transmissions. It also includes servicing and repair of electrical and electronic components of automatic transmissions (CVT).

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service automatic transmission gear box.  (planetary type) |  | **X** |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service automatic transmission electronic  control system (planetary gear type). |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service continuously variable transmission  gear box (CVT). |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service electronic control system of  continuously variable transmissions (CVT). |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Service electronic controlled components of four wheel drive automatic transmission gear  box. |  | **X** |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 224 - Traction Control

This course is designed to enhance the knowledge, skills and attitude of an individual in servicing automotive traction control, such as Anti-lock Brake System (ABS), Stability Control system, electronic traction control system, and electronic controlled suspension system. It also includes reading circuit diagrams, troubleshooting, and servicing traction control systems.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Service Anti-lock Brake System. |  |  |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Service Stability Control System. |  |  |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 3. Service Electronic Traction Control. |  |  |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 4. Service Electronic Controlled Suspension  System. |  |  |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 5. Troubleshoot Traction Control System  problems. |  |  |  | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |

# AT 229 – Automotive Technology Service Learning II

Automotive Technology Service Learning II is a method by which students learn through active participation in organized service conducted in the industry. Automotive Technology Service Learning II is integrated into and enhances the course and program learning outcomes. It includes structured means for critical thinking on service experience and helps to foster civic and career responsibility. This course allows students to practice the skills learned in servicing undercarriage components, but not limited to explore and learn other automotive skills throughout the duration of the time in the industry.

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| **CLO**  Students will be able to: | **PLO** | | | |  | **ILO** | | | | | |
| **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** |  | **ILO 1** | **ILO 2** | **ILO 3** | **ILO 4** | **ILO 5** | **ILO 6** |
| 1. Demonstrate proper employee behavior and  work habits. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |
| 2. Perform automotive mechanic tasks as  assigned by a site supervisor. | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** | **X** | **X** | **X** |