



Transportation Technology IV: Advanced Automotive Mechanics

Second Semester

Course Information

Grade(s):	11-12
Discipline/Course:	Technology Education
Course Title:	Transportation Technology IV: Advanced Automotive Mechanics, Semester II
Prerequisite(s):	Transportation Technology III: Intermediate Auto Maintenance and Servicing (Full Year) <i>or</i> Transportation Technology IV: Advanced Automotive Mechanics (Semester) with teacher's permission <i>or</i> Teacher's Permission
Course Description: <i>Program of Studies</i>	Advanced Automotive Mechanics continues and deepens students' understanding of automobile servicing and maintenance/repair. Work is performed on operational vehicles. Complete overhaul, repair, servicing and troubleshooting of all automotive systems are undertaken. Emphasis is placed on practical hands-on learning.
Course Essential Questions:	<ul style="list-style-type: none"> ● What knowledge, skills, and safety practices are required to diagnose and repair various automotive systems? ● Why is it important to follow procedures and practices of various manufacturers regarding repair and maintenance schedules? ● How does innovation in engineering impact the real world application of new and emerging technologies? ● How have emissions control systems impacted the environment?
Course Enduring Understandings:	<ul style="list-style-type: none"> ● There are various components and functions of systems related to engine performance. ● Problems commonly found in non-commercial vehicles can be dealt with through assessing, diagnosing and addressing the issues. ● Automotive technicians must stay current in the field as technologies continue to change. ● Brakes must be properly maintained to be effective. ● Traction control and stability are essential to the proper handling of a vehicle.
Duration/Credit:	Semester / 0.5 credit

Course Materials/Resources:	Equipment and Consumables.
FPS Course Academic Expectation(s):	EU: Exploring and Understanding CC: Creating and Constructing
Semester at a Glance (Units):	<ul style="list-style-type: none"> ● Unit 1: Cooling System Testing, Maintenance and Repair (4-5 weeks) ● Unit 2: Lubrication System Testing, Service and Repair (4-5 weeks) ● Unit 3: Emission Control System Testing, service and Repair (5 weeks) ● Unit 4: Brake System Diagnosis and Repair & Anti-Lock Brake and Traction Control Diagnosis (5 weeks)

Unit Number and Title:	Unit 1: Cooling System Testing, Maintenance and Repair.
Duration:	4-5 Weeks.
Resource(s):	Textbook, Equipment & Consumables.
Unit Overview:	Coolant testing and coolant systems flushing is an essential part of vehicle maintenance. Chemicals, automotive systems and automotive assemblies interact and rely on each other, so it is important to understand the scientific principles related to diagnosis of cooling systems problems. The chemical, mechanical and physical function of various engines and systems are discussed, diagnosed and fixed.
Learning Goals	
Standard(s):	AUTO.03.06 Explain scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems. AUTO.05 Diagnosis and repair engines, including but not limited to two- and four-stroke and supporting subsystems
Essential Question(s):	<ul style="list-style-type: none"> ● What knowledge, skills, and safety practices are required to diagnose and repair various automotive systems? ● Why is it important to follow procedures and practices of various manufacturers regarding repair and maintenance schedules? ● How does innovation in engineering impact the real world application of new and emerging technologies?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● There are various components and functions of systems related to engine performance. ● Problems commonly found in non-commercial vehicles can be dealt with through assessing, diagnosing and addressing the issues. ● Automotive technicians must stay current in the field as technologies continue to change.
Learning Goal(s): <i>Students will know and will</i>	Content: (Students will know...)

<p><i>be able to use their learning to:</i> (Content/ Skills)</p>	<ul style="list-style-type: none">● basic scientific principles as they apply to the standard vehicle and the systems found within. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none">● remove, repair and replace cooling system components, as necessary.● test cooling system for coolant levels and concentrations.● check and replace all parts of the cooling system.● describe the most common causes of system leakage and overheating.
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Unit Number and Title:	Unit 2: Lubrication System Testing, Service and Repair.
Duration:	4-5 Weeks.
Resource(s):	Text, Equipment & Consumables.
Unit Overview:	Lubrication systems are dynamic. The various lubrication systems found in a vehicle must be maintained on a regular basis, as lubricants break down. Students will learn each lubrication system and how to properly diagnose, service and maintain all lubrication systems.
Learning Goals	
Standard(s):	AUTO.03.06 Explain scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems. AUTO.05 Diagnosis and repair engines, including but not limited to two- and four-stroke and supporting subsystems.
Essential Question(s):	<ul style="list-style-type: none"> ● What knowledge, skills, and safety practices are required to diagnose and repair various automotive systems? ● Why is it important to follow procedures and practices of various manufacturers regarding repair and maintenance schedules? ● How does innovation in engineering impact the real world application of new and emerging technologies?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● There are various components and functions of systems related to engine performance. ● Problems commonly found in non-commercial vehicles can be dealt with through assessing, diagnosing and addressing the issues. ● Automotive technicians must stay current in the field as technologies continue to change.
Learning Goal(s): <i>Students will know and will be able to use their learning</i>	Content: (Students will know...) <ul style="list-style-type: none"> ● the process for diagnosing and repairing cooling systems.

<p><i>to:</i> (Content/ Skills)</p>	<ul style="list-style-type: none">● scientific principles in relation to chemical, mechanical, and physical functions for cooling systems. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none">● describe lubrication system problems.● diagnose lubrication system problems.● change oil and filter systems.● lubricate and check necessary parts.● service an engine lubrication system.
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Unit Number and Title:	Unit 3: Emission Control System Testing, Service and Repair.
Duration:	5 Weeks.
Resource(s):	Textbook, Equipment & Consumables.
Unit Overview:	Emission systems must be tested and maintained to function properly. Students will learn the proper methods to diagnose, service and repair the Emission Control System.
Learning Goals	
Standard(s):	AUTO.05.03 Diagnosis and repair engines, including but not limited to two- and four-stroke and supporting subsystems. AUTO.07.03 Engine Performance: Describe the components and functions of the various systems that are related to engine performance.
Essential Question(s):	<ul style="list-style-type: none"> • How have emissions control systems impacted the environment?
Enduring Understanding(s):	<ul style="list-style-type: none"> • There are various components and functions of systems related to engine performance. • Problems commonly found in non-commercial vehicles can be dealt with through assessing, diagnosing and addressing the issues. • Automotive technicians must stay current in the field as technologies continue to change.
Learning Goal(s): <i>Students will know and will be able to use their learning to:</i> (Content/ Skills)	<p>Content: (Students will know...)</p> <ul style="list-style-type: none"> • the main causes of emission control problems. • emission control problems affect an engine's performance. • differences between a sensor and actuator. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none"> • inspect and troubleshoot emission control systems. • test, remove or replace emission control components, as necessary. • scan a vehicle exhaust to diagnose emission control problems.

Unit Number and Title:	Unit 4: Brake System Diagnosis and Repair & Anti-Lock Brake and Traction Control Diagnosis.
Duration:	5 Weeks.
Resource(s):	Textbook, Equipment & Consumables.
Unit Overview:	Brake and Traction Control systems vary across vehicles, yet are essential to the proper handling of a vehicle. This unit covers the basics found in all Brake and Traction Control systems, and students learn to diagnose and service the basic parts of these systems, including the role of fluid dynamics.
Learning Goals	
Standard(s):	AUTO.09 Demonstrate function and principles of automotive drivetrain, steering and suspension, brake, and tire and wheel components and systems in accordance with portable national industry standards.
Essential Question(s):	<ul style="list-style-type: none"> • What knowledge, skills, and safety practices are required to diagnose and repair various automotive systems? • Why is it important to follow procedures and practices of various manufacturers regarding repair and maintenance schedules? • How does innovation in engineering impact the real world application of new and emerging technologies?
Enduring Understanding(s):	<ul style="list-style-type: none"> • Brakes must be properly maintained to be effective. • Traction control and stability are essential to the proper handling of a vehicle.
Learning Goal(s): <i>Students will know and will be able to use their learning to:</i> (Content/ Skills)	Content: (Students will know...) <ul style="list-style-type: none"> • tools and techniques used to assess various problems found in brake systems. • tools and techniques to service / replace brake systems. • tools and techniques to service / replace traction control systems. • fluid dynamics apply to the modern brake system.

Skills: (Students will be able to...)

- diagnose common brake problems.
- bleed a hydraulic brake system, as necessary.
- diagnose and repair a vehicle's disc or drum brake system, as necessary.
- inspect and repair anti-lock brakes, traction control, and stability control systems, as necessary.