Transportation Technology IV:
Advanced Automotive Mechanics

First Semester

Course Information

Grade(s):	11-12
Discipline/Course:	Technology Education
Course Title:	Transportation Technology IV: Advanced Automotive Mechanics, Semester I
Prerequisite(s):	Transportation Technology III: Intermediate Auto Maintenance and Servicing (Full Year) *or* Transportation Technology III: Intermediate Auto Maintenance and Servicing (Semester) with teacher's permission *or* Teacher's Permission.
Course Description: *Program of Studies*	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:	● Why is it important to follow procedures and practices of various manufacturers regarding repair and maintenance schedules? ● What knowledge, skills, and safety practices are required to diagnose and repair various automotive systems? ● What are the main components of an electronic fuel system? ● 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 does innovation in engineering impact the real world application of new and emerging technologies?
Course Enduring	● There are various components and functions of systems related to engine performance.

Understandings:	● 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.
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):	● Unit 1: Automotive Careers, ASE Certification/Safety Review & Service Information and Work Orders (2 weeks). ● Unit 2: Computer System Service and Diagnosis (3-4 weeks). ● Unit 3: Fuel Injection Diagnosis and Servicing (3-4 weeks). ● Unit 4: Starting System, Charging System and Ignition System Testing and Repair (4-5 weeks). ● Unit 5: Hybrid System Operation and Service (4-5 weeks).

Unit Number and Title:	Unit 1: Automotive Careers, ASE Certification/Safety Review & Service Information and Work Orders
Duration:	2 Weeks.
Resource(s):	Text.
Unit Overview:	This unit discusses careers found in the automotive industry and the proper way to gain ASE certifications in order to become a qualified automotive technician. The unit also looks at the shop as a functioning business and discusses proper record keeping and work order write up found in the modern garage.
Learning Goals	
Standard(s):	Automotive Technology AUTO.02 Customer Relations and Shop Procedures: Explain the basic processes and procedures for maintaining a clean, safe and customer friendly shop. AUTO.04 Perform and document maintenance procedures in accordance with the recommendations of the manufacturer.
Essential Question(s):	● Why is it important to follow procedures and practices of various manufacturers regarding repair and maintenance schedules?
Enduring Understanding(s):	● 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): *Students will know and will be able to use their learning to:* (Content/ Skills)	**Content** (Students will know …) ● the responsibilities and requirements of a qualified automotive technician. ● the proper route to become a qualified automotive technician. **Skills** (Students will be able to …)

	● use computer based service information to solve part replacements and repairs.

Unit Number and Title:	Unit 2: Computer System Service and Diagnosis.
Duration:	3-4 Weeks.
Resource(s):	Text / Diagnostic Tools.
Unit Overview:	This unit covers the proper tools and techniques used to diagnose common problems found with the computer systems utilized in the modern vehicle. The unit also discusses the role computer and emission control systems play in vehicle performance and engine tuning.
Learning Goals	
Standard(s):	AUTO.02 Customer Relations and Shop Procedures: Explain the basic processes and procedures for maintaining a clean, safe and customer-friendly shop. AUTO.04 Perform and document maintenance procedures in accordance with the recommendations of the manufacturer. AUTO.05 Diagnosis and repair engines, including but not limited to two- and four-stroke and supporting subsystems. AUTO.07 Engine Performance: Describe the components and functions of the various systems that are related to engine performance.
Essential Question(s):	● What knowledge, skills, and safety practices are required to diagnose and repair various automotive systems?
Enduring Understanding(s):	● 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): *Students will know and will be able to use their learning*	**Content** (Students will know …) ● what to look for during a preliminary inspection of an auto electronics/computer system.

to: (Content/ Skills)	● computers helping in the diagnosis of an engine performance problem. **Skills** (Students will be able to …) ● test and diagnose automotive computer problems. ● replace sensors and actuators.

Unit Number and Title:	Unit 3: Fuel Injection Diagnosis and Servicing.
Duration:	3-4 Weeks.
Resource(s):	Text and diagnostic sensors, computer.
Unit Overview:	Students will learn how electronic fuel management systems impact vehicle reliability.and the proper diagnosis and servicing of the injection system.
Learning Goals	
Standard(s):	AUTO.03.09 Explain scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems. AUTO.07.02Engine Performance: Describe the components and functions of the various systems that are related to engine performance.
Essential Question(s):	● What are the main components of an electronic fuel system?
Enduring Understanding(s):	● 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): *Students will know and will be able to use their learning to:* (Content/ Skills)	**Content** (Students will know …) ● operating principles of fuel pressure regulator, multi-port injection system and the throttle body located on a vehicle. ● what types of adjustments can be made to the fuel injection system. **Skills** (Students will be able to …) ● test, remove and replace fuel system component parts. ● diagnose fuel system problems using diagnostic equipment. ● use service manuals when making basic adjustments on gasoline injection systems.

Unit Number and Title:	Unit 4: Starting System, Charging System and Ignition System Testing and Repair .
Duration:	4-5 Weeks.
Resource(s):	Text / Diagnostic tools.
Unit Overview:	Students will troubleshoot and diagnose the starting, charging and ignition systems in a vehicle and will gain a general knowledge of each system.How does an increased understanding of electricity and electronics impact the ability of an auto technician to perform diagnosis and repair? Diagnostic tools are updated and utilized on a regular basis to troubleshoot and diagnose each system.
Learning Goals	
Standard(s):	AUTO.06 Demonstrate the function, principles, and operation of electrical and electronic systems using manufacturer and industry standards.AUTO.06.01, AUTO.06.02, AUTO.06.03, AUTO.06.04 AUTO.07.01 Engine Performance: Describe the components and functions of the various systems that are related to engine performance.
Essential Question(s):	● 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):	● 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): *Students will know and will*	**Content** (Students will know …)

be able to use their learning to: (Content/ Skills)	● common causes of a no-crank problem. ● problems associated with a charging system. ● common ignition system problems. **Skills** (Students will be able to …) ● maintain, diagnose, and repair electrical systems. ● describe the components and functions of the various electrical and electronic systems that are related to engine performance. ● remove and replace a starter motor if necessary. ● repair common starting problems. remove, test, repair, and replace an alternator, if necessary. ● repair charging system problems. ● test, remove and replace ignition system parts, as required. ● repair typical ignition system problems.

Unit Number and Title:	Unit 5: Hybrid System Operation and Service.
Duration:	4-5 weeks.
Resource(s):	Equipment & Consumables.
Unit Overview:	The operation and servicing of hybrid systems in the modern vehicle.
Learning Goals	
Standard(s):	AUTO.04.04 Perform and document maintenance procedures in accordance with the recommendations of the manufacturer. TRAN.02.08 Define transportation technology systems.
Essential Question(s):	● How does innovation in engineering impact the real world application of new and emerging technologies?
Enduring Understanding(s):	● Automotive technicians must stay current in the field as technologies continue to change.
Learning Goal(s): *Students will know and will be able to use their learning to:* (Content/ Skills)	**Content** (Students will know …) ● the advantages of a Hybrid vehicle. ● safety precautions that must be followed when working on a Hybrid vehicle. ● types of problems that can occur with a Hybrid drive system. **Skills (**Students will be able to …) ● explain advantages and disadvantages of existing, new, and emerging systems in automobiles. ● explain the operational principles of hybrid drive systems and how they are impacting the environment.