



Auto Repair Technician

PROGRAM OUTLINE

PROGRAM GOAL AND OUTCOMES

Program Goal

To prepare students to enter the automotive repair field by studying the major automotive systems, the procedures for servicing those systems, diagnosing customer concerns, and suggesting service solutions to those concerns while working toward ASE (National Institute for Automotive Service Excellence) certification.

Program Outcomes	Lessons	Evidence of Learning
Recognize the steps necessary to attain certification in the automotive repair field, and identify automotive systems	Introduction to Auto Repair	Multiple-choice lesson exams
Recognize engine components that make up the lower-end assembly, and describe how the systems and parts work together to make a vehicle run	Automotive Engines: Lower-End Assembly	Multiple-choice lesson exams
Recognize engine components that make up the upper-end assembly, and describe how the systems and parts work together to make a vehicle run	Automotive Engines: Upper-End Assembly	Multiple-choice lesson exams
Recognize safety procedures that should be followed in an automotive repair shop, and list the various hand tools and specialized tools used when working with automotive systems	Automotive Safety, Tools, and Equipment	Multiple-choice lesson exams
Describe how to perform basic automotive preventative maintenance and routine service procedures to include an engine oil change	Preventative Maintenance and Service Procedures	Multiple-choice lesson exams
Apply basic mathematical operations (addition, subtraction, multiplication, and division) and interpret the meaning of basic physics concepts of mechanics, forces, thermodynamics, heat, electricity, and magnetism to solve math-related problem	Scientific Principles and Math	Multiple-choice lesson exams
Identify and interpret the construction and operation of gasoline engines and explain how to diagnose and repair malfunctions in engine components and subsystems	Engine Basics	Multiple-choice lesson exams
	Engine Diagnosis & Service	Multiple-choice lesson exams

Describe the process of removing an engine from a vehicle and performing an engine rebuild	Engine Repair	Multiple-choice lesson exams
Explain basic electrical concepts and units including resistance, voltage, and current and principles of electricity, magnetism, circuits, and wiring diagrams and how they are used to service all automotive electrical and electronic systems to include using a Digital Multimeter (DMM)	Basics, Tools, and Wiring	Multiple-choice lesson exams
	Electronics	Multiple-choice lesson exams
	Engine Electrical Systems	Multiple-choice lesson exams
	Vehicle Electrical Systems	Multiple-choice lesson exams
Describe the principles and functions of HVAC (heating, ventilation, and air-conditioning) systems and explain how testing and service procedures are performed on these systems	HVAC Operation	Multiple-choice lesson exams
	HVAC Diagnosis and Service	Multiple-choice lesson exams
Describe the operation of computerized gasoline-engine controls and performance systems and explain how to diagnose and repair drivability and emissions malfunctions in these systems	Engine Fuels and Ignition Systems	Multiple-choice lesson exams
	Engine Fuel Management.	Multiple-choice lesson exams
	Engine Emissions Control	Multiple-choice lesson exams
	Engine Diagnostics	Multiple-choice lesson exams
Identify the components and systems of a Hybrid Electric and Fuel Cell Vehicle and explain their operation	Hybrid Electric and Fuel Cell Vehicles	Multiple-choice lesson exams
Identify and interpret the operation of hydraulic brake systems and describe how to diagnose and repair malfunctions in all automotive brake systems	Hydraulic Braking Systems	Multiple-choice lesson exams
	Drum & Disc Brakes	Multiple-choice lesson exams
	Antilock Braking Systems and Electronic Stability Control	Multiple-choice lesson exams
Identify and interpret the operation of suspension and steering system and describe how to diagnose and repair malfunctions in steering and suspension systems	Tires & Wheels	Multiple-choice lesson exams
	Suspension Systems	Multiple-choice lesson exams
	Steering & Alignment	Multiple-choice lesson exams
Identify and interpret the construction and operation of manual transmissions/transaxles, rear axles, drive axles, four wheel drive units and describe how to rebuild transmissions, transaxles, differentials, transfer cases, and perform in-vehicle routine maintenance, inspections, repairs, and external adjustments	Clutch & Manual Transmissions	Multiple-choice lesson exams
	Axles, 4WD & AWD	Multiple-choice lesson exams
Identify and interpret the construction and operation of automatic transmissions and transaxles and describe how to rebuild transmissions/transaxles, perform in-vehicle routine maintenance, inspections, repairs, and external adjustments	Automatic Transmission and Transaxle Operation	Multiple-choice lesson exams
	Automatic Transmission Diagnosis, Service, and Repair	Multiple-choice lesson exams

PROGRAM STRUCTURE

Starting Your Program

Lesson 1 **Starting Your Program**

Introduction to Automotive Repair

Lesson 2 **Introduction to Auto Repair**

Lesson 3 **Automotive Engines: Lower-End Assembly**

Lesson 4 **Automotive Engines: Upper-End Assembly**

Automotive Repair Foundations

Lesson 5 **Automotive Safety, Tools, and Equipment**

Lesson 6 **Preventative Maintenance and Service Procedures**

Lesson 7 **Scientific Principles and Math**

Engine Repair

Lesson 8 **Engine Basics**

Lesson 9 **Engine Diagnosis and Service**

Lesson 10 **Engine Repair**

Textbook ***Automotive Technology: Principles, Diagnosis, and Service***

Electrical and Electronic Systems

Lesson 11 **Basics, Tools, and Wiring**

Lesson 12 **Electronics**

Lesson 13 **Engine Electrical Systems**

Lesson 14 **Vehicle Electrical Systems**

Heating, Ventilation, and Air Conditioning

Lesson 15 **HVAC Operation**

Lesson 16 **HVAC Diagnosis and Service**

Engine Performance

Lesson 17 **Engine Fuels and Ignition Systems**

Lesson 18 **Engine Fuel Management**

Lesson 19 **Engine Emissions Control**

Lesson 20 **Engine Diagnostics**

Alternative Vehicles

Lesson 21 **Hybrid Electric and Fuel Cell Vehicles**

Automotive Brakes

Lesson 22

Hydraulic Braking Systems

Lesson 23

Drum and Disc Brakes

Lesson 24

Antilock Braking Systems and Electronic Stability Control

Suspension and Steering

Lesson 25

Tires and Wheels

Lesson 26

Suspension Systems

Lesson 27

Steering and Alignment

Manual Drive Train

Lesson 28

Clutch and Manual Transmissions

Lesson 29

Axles, 4WD, and AWD

Automatic Transmissions and Transaxles

Lesson 30

Automatic Transmission and Transaxle Operation

Lesson 31

Automatic Transmission Diagnosis, Service, and Repair

COURSE DESCRIPTIONS AND OBJECTIVES

SYP101: Starting Your Program

In this course, you'll develop the necessary skills to ensure your success in the program. You'll learn how you can improve your study skills, so you're able to use a number of tools that will help you to be successful.

By the end of this course, you'll be able to:

- Identify skills needed to be a confident and independent online learner

AUT001: Introduction to Auto Repair

In this course, you'll concentrate on essential components of an automotive repair technician. You'll also review the parts that make up the lower-end and upper-end assembly and how they work.

By the end of this course, you'll be able to:

- Connect your goals to the automotive repair technician profession and its essential knowledge
- Examine parts that make up the lower-end assembly and how they work
- Examine parts that make up the upper-end assembly and how they work

AUT002: Automotive Repair Foundations

In this course, you'll review safety in automotive repair technician, as well as maintenance. You'll also review math used in auto repair.

By the end of this course, you'll be able to:

- Analyze work safety and equipment use
- Apply preventive maintenance and service procedures
- Relate how scientific principle and math aid in auto repair

AUT003: Engine Repair

In this course, you'll learn about gasoline and engine operation. You'll also review engine issues as well as how to remove, disassemble, measure, repair, assemble, and install an internal combustion gasoline-fueled engine.

By the end of this course, you'll be able to:

- Explain gasoline and diesel engine operation, including cooling and lubrication systems and intake and exhaust systems
- Define typical engine-related complaints and engine smoke diagnosis
- Identify the detailed process of removing, disassembling, measuring, repairing, assembling, and installing an internal combustion gasoline-fueled engine

AUT004: Electrical and Electronic Systems

In this course, you'll explore electricity, as well as capacitance, electromagnetism, and electronics. You'll then identify batteries. Finally, you'll review interior and exterior safety and entertainment systems.

By the end of this course, you'll be able to:

- Describe the basics of electricity, including circuits, Ohm's and Kirchhoff's laws, the testing equipment used for diagnosis, service wiring repair, schematics, and testing
- Analyze the fundamentals of capacitance, electromagnetism, and electronics, including solid state devices and the study of controller area networks
- Explain how batteries work and servicing and operating the engine cranking and electrical charging systems
- Describe the service and operation of interior and exterior safety and entertainment systems

AUT005: Heating, Ventilation, and Air Conditioning

In this course, you'll cover the fundamentals of heating, ventilation, and air conditioning (HVAC), including heating and automatic air-conditioning systems operation. Then, you'll review the industry procedures used to diagnose and repair HVAC customer concerns. Finally, you'll discuss the various service procedures used for HVAC systems.

By the end of this course, you'll be able to:

- Describe the fundamentals of heating, ventilation, and air conditioning (HVAC), including heating and automatic air-conditioning systems operation
- Explain the industry procedures used to diagnose, service, and repair HVAC customer concerns

AUT006: Engine Performance

In this course, you'll cover details about gasoline, alternative fuels, and diesel fuels along with the fundamentals, diagnosis, and service of ignition systems.

By the end of this course, you'll be able to:

- Describe gasoline, alternative fuels, and diesel fuels along with the fundamentals, diagnosis, and service of engine ignition systems
- Define fuel systems operation, including computer operation fundamentals, input sensors, fuel supply systems, fuel delivery systems, and fuel system diagnosis
- Identify the many different systems used for engine emission control
- Explain onboard diagnostics generation II (OBD-II) and strategy-based diagnosis

AUT007: Alternative Vehicles

In this course, you'll learn how to identify the components and systems of a Hybrid Electric and Fuel Cell Vehicle and explain its operation.

By the end of this course, you'll be able to:

- Identify the very specific service procedures needed to maintain an HEV

AUT008: Automotive Brakes

In this course, you'll learn how to identify and interpret the operation of hydraulic brake systems and describe how to diagnose and repair malfunctions in all automotive brake systems.

By the end of this course, you'll be able to:

- Describe the components and function of hydraulic brakes and how to service them
- Explain drum and disc brakes, how they work, and how to service them
- Define antilock braking systems and electronic stability control and how they work

AUT009: Suspension and Steering

In this course, you'll learn how to identify and interpret the operation of suspension and steering systems. You'll also learn how to diagnose and repair malfunctions in steering and suspension systems.

By the end of this course, you'll be able to:

- Discuss the operation of wheels and tires and describe their diagnosis and repair
- Describe the operation, diagnosis, and repair of suspension systems
- Identify steering systems and how to perform an alignment

AUT010: Manual Drive Train

In this course, you'll learn how to identify and interpret the construction and operation of manual transmissions/transaxles, rear axles, drive axles, and four-wheel drive units. You'll also learn how to rebuild transmissions, transaxles, differentials, and transfer cases as well as perform in-vehicle routine maintenance, inspections, repairs, and external adjustments.

By the end of this course, you'll be able to:

- Discuss the operation, diagnosis, and repair of clutch and manual transmissions and transaxles
- Describe the axles, differential, four-wheel drive, and all-wheel drive

AUT011: Automatic Transmissions and Transaxles

In this course, you'll learn how to identify and interpret the construction and operation of automatic transmissions and transaxles. You'll also learn how to rebuild transmissions/transaxles and perform in-vehicle routine maintenance, inspections, repairs, and external adjustments.

By the end of this course, you'll be able to:

- Define how automatic transmissions and transaxles operate
- Explain how to diagnosis, service, and repair automatic transmissions and transaxles

Note: The titles of your learning materials may be different from those listed on your program outline. There is no need to call your instructor about these differences. While the titles of certain learning materials may differ, the educational content is the same. All learning materials are designed to give you the finest education in your field. If you need instructional assistance, however, be sure to call for help. We reserve the right to revise the program of study and the instructional materials and to substitute for the items of equipment offered.