

# Auto Repair Technician: Program Outline

## 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	Courses	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 preventive maintenance and routine service procedures to include an engine oil change	Preventive 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 problems	Scientific Principles and Math	Multiple-choice lesson exams
Identify and interpret the construction and operation of gasoline engines and	Engine Basics	Multiple-choice lesson exams

Program Outcomes	Courses	Evidence of Learning
explain how to diagnose and repair malfunctions in engine components and subsystems	Engine Diagnosis and 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 hybrid electric and fuel cell vehicles 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 and 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 systems and describe how to diagnose and repair malfunctions in steering and suspension systems	Tires and Wheels	Multiple-choice lesson exams
	Suspension Systems	Multiple-choice lesson exams
	Steering and Alignment	Multiple-choice lesson exams

Program Outcomes	Courses	Evidence of Learning
Identify and interpret the construction and operation of manual transmissions/ transaxles, rear axles, drive axles and 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 and Manual Transmissions	Multiple-choice lesson exams
	Axles, 4WD, and AWD	Multiple-choice lesson exams
Identify and interpret the construction and operation of automatic transmissions and transaxles and describe how to rebuild transmissions/transaxles and 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

### AUT001: Introduction to Automotive Repair

Lesson 2 Introduction to Auto Repair

Lesson 3 Automotive Engines: Lower-End Assembly

Lesson 4 Automotive Engines: Upper-End Assembly

### AUT002: Automotive Repair Foundations

Lesson 5 Automotive Safety, Tools, and Equipment

Lesson 6 Preventive Maintenance and Service Procedures

Lesson 7 Scientific Principles and Math

### AUT003: Engine Repair

Lesson 8 Engine Basics

Lesson 9 Engine Diagnosis and Service

Lesson 10 Engine Repair

Textbook Automotive Technology: Principles, Diagnosis, and Service

**AUT004: Electrical and Electronic Systems**

Lesson 11	Basics, Tools, and Wiring
Lesson 12	Electronics
Lesson 13	Engine Electrical Systems
Lesson 14	Vehicle Electrical Systems

**AUT005: Heating, Ventilation, and Air Conditioning**

Lesson 15	HVAC Operation
Lesson 16	HVAC Diagnosis and Service

**AUT006: Engine Performance**

Lesson 17	Engine Fuels and Ignition Systems
Lesson 18	Engine Fuel Management
Lesson 19	Engine Emissions Control
Lesson 20	Engine Diagnostics

**AUT007: Alternative Vehicles**

Lesson 21	Hybrid Electric and Fuel Cell Vehicles
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**AUT008: Automotive Brakes**

Lesson 22	Hydraulic Braking Systems
Lesson 23	Drum and Disc Brakes
Lesson 24	Antilock Braking Systems and Electronic Stability Control

**AUT009: Suspension and Steering**

Lesson 25	Tires and Wheels
Lesson 26	Suspension Systems
Lesson 27	Steering and Alignment

**AUT010: Manual Drive Train**

Lesson 28	Clutch and Manual Transmissions
Lesson 29	Axles, 4WD, and AWD

**AUT011: Automatic Transmissions and Transaxles**

Lesson 30	Automatic Transmission and Transaxle Operation
Lesson 31	Automatic Transmission Diagnosis, Service, and Repair

# Course Descriptions and Objectives

## 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 do the following:

- 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 as well as maintenance. You'll also review math used in auto repair.

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

- 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 do the following:

- 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

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**AUT004: Electrical and Electronic Systems**

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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 do the following:

- 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

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**AUT005: Heating, Ventilation, and Air Conditioning**

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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 do the following:

- 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

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**AUT006: Engine Performance**

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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 do the following:

- 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

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**AUT007: Alternative Vehicles**

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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 do the following:

- 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 do the following:

- 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 do the following:

- 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 do the following:

- 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 do the following:

- Define how automatic transmissions and transaxles operate
- Explain how to diagnose, 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.