

# AUTOMOTIVE (AUT)

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## **AUT 101 Basic Electricity for Automotive (2 Credits)**

**Prerequisites with concurrency:** AUT 106.

Provides understanding of fundamental principles of electricity. Covers basic electrical quantities, Ohm's law, power, series, and parallel circuits, magnetism, electromagnetism and an introduction to DC-current troubleshooting. Introduces student to the use of a digital multimeter and oscilloscope. Student will also be introduced to electrical schematics. A self-paced course.

## **AUT 102 Automotive Electric I (5 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

**Recommended preparation:** MTH 060 or higher or minimum placement Math Level 10.

Covers Automotive Electrical Skills. Introduces the testing, disassembly, and rebuilding of various electrical equipment. Troubleshooting and using various test equipment common to the Automotive trade will be stressed. Introduces the use of automotive scan tools for basic diagnostics. Introduces the use of intrusive and non-intrusive testing methods.

## **AUT 103 Automotive Electric II (2 Credits)**

**Prerequisites with concurrency:** AUT 102.

Studies disassembly, testing and rebuilding of various electrical equipment. Stresses troubleshooting and using various test equipment common to the automotive trade.

## **AUT 104 Automotive Electric III (2 Credits)**

**Prerequisites:** AUT 103.

A hands-on study and familiarization of repair procedures for air bag, security entry and cruise control systems. Learn diagnostic and repair procedures using body control modules. Learn diagnostics and repair procedures for hybrid and new electrical systems.

## **AUT 105 Diesel Performance I (2 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

Introduces principles of diesel systems and basic diagnosis. Includes engine analysis, cooling and exhaust systems, fuel management systems and diesel engines.

## **AUT 106 Automotive Program Orientation (1 Credit)**

**Recommended preparation:** or to be taken with AUT 101, AUT 107, AUT 110, AUT 115, and MTH 060 or higher or minimum placement Math Level 10.

Introduction to the Automotive program. Provides an introduction of the fundamental principles of automotive shop safety and tool care. Guidance given on the self-paced course format. This course is required prior to taking any automotive course. This is a three-day, intensive course that is only taught at the beginning of each term. Permissible to be taken in a term along with other automotive courses. P/NP grading.

## **AUT 107 Mechanical Systems I (3 Credits)**

**Prerequisites with concurrency:** AUT 106.

Provides an understanding of the fundamental principles of automotive shop safety and tool care. Develops mechanical knowledge and skills utilized throughout a career in the automotive field. Includes techniques of routine vehicle maintenance. Includes customer vehicle identification and handling, new vehicle pre-delivery inspection and preparation, safety inspection, lubrication tasks, and light line tasks. A self-paced course.

## **AUT 110 Small Gas Engines (3 Credits)**

**Prerequisites with concurrency:** AUT 106.

Designed to study and apply the theory, operation, diagnoses and repair of small gas engines and their use in the world today. A self-paced course.

## **AUT 111 Computerized Engine Controls (5 Credits)**

**Prerequisites:** AUT 205.

Studies advanced electrical systems found on late-model vehicles. Provides solid understanding of computerized automotive engine control systems and how they operate and the ability to diagnose, troubleshoot and repair computerized engine control systems.

## **AUT 112 Basic Engine Performance I (1 Credit)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

Designed to study and apply the theory, operation, diagnoses and repair of the points-type ignition and carburetion systems as they were used in vehicles of the past.

## **AUT 113 Basic Engine Performance II (1 Credit)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

Designed to continue the study and apply the theory presented in AUT 112 Basic Engine Performance I. Continues with the operation, diagnoses, and repair of the carburetion system as it was used in vehicles of the past.

## **AUT 114 Welding for the Automotive Trade (3 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110, and AUT 115.

Provides a basic understanding of the fundamental principles of automotive fabrication, including safety topics. Topics introduce students to focused areas that are required when replacing vehicle components that include a light level of fabrication. (A scheduled self-paced course).

## **AUT 115 College Success for Automotive Technology (2 Credits)**

**Prerequisites with concurrency:** AUT 106.

**Recommended preparation:** or to be taken with: MTH 060 or higher or minimum placement Math Level 10.

Prepares students for successful completion of the Automotive Technology degree at COCC and explores careers as an automotive technician and professional. Offers a condensed version of the College Success course geared toward the two Automotive Technology degrees and/or the multiple Automotive Certificates. Introduces the various automotive information systems, hand tool usage, Scan Tool introduction, and resume preparation.

## **AUT 188 Special Studies: Automotive Technology (1-4 Credits)**

Explores topics of current interest in the automotive discipline.

## **AUT 199 Selected Topics: Automotive (1-4 Credits)**

This course is in development.

## **AUT 201 Automotive Engines (4 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

**Recommended preparation:** or to be taken with: MTH 060 or higher or minimum placement Math Level 10.

Provides information on the construction, operation and design of the internal combustion engine. Teaches the concepts and procedures of engine work to cover the proper procedure in rebuilding a four-cycle internal combustion engine. Includes a combination of guided lecture and laboratory applications, stressing safety, accuracy of measure, proper usage of tools, and application of repair manuals through actual overhaul of engines.

**AUT 202 Manual Drive Trains I (3 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

**Recommended preparation:** MTH 060 or higher or minimum placement Math Level 10.

A self-paced course that studies standard transmissions and transaxles. Students will learn on college-owned components. The students will learn operating principles, diagnosis, construction, approved repair procedures, and overhaul of current transmission types on manual transmissions and transaxles.

**AUT 203 Manual Drive Trains II (3 Credits)**

**Prerequisites with concurrency:** AUT 202.

Second part of a manual transmission sequence. A study of standard transmission and the relationship to clutches, driveshafts, rear axle assembly, transaxle, shift controls and four-wheel drive components. Students will learn on college-owned components. The student will learn operating principles, diagnosis and approved repair procedures on manual transmissions and related power train components. Includes emphasis on diagnosis, service, and procedure to conform to current service manuals.

**AUT 204 Steering and Suspension (3 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

Designed to study and apply the theory, operation, diagnoses and repair of the modern suspension and steering systems.

**AUT 205 Engine Performance I (2 Credits)**

**Prerequisites with concurrency:** AUT 103.

Studies the diagnosis of drivability problems. Covers engine analysis, cooling and exhaust systems, ignition and fuel management systems.

**AUT 206 Engine Performance II (2 Credits)**

**Prerequisites with concurrency:** AUT 111.

Studies diagnosis of drivability problems. Includes further study of engine analysis, ignition and fuel management systems, and super performance diagnosis. Provides the technician with a look into the causes of automotive emissions in relation to vehicles that are four years old and newer. Looks at various methods of emissions inspection/maintenance testing, the diagnosis of failed vehicles, and enhanced on-board computer systems. Also covers the testing of alternative-fuel vehicles.

**AUT 208 Automotive Brakes (3 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

**Recommended preparation:** or to be taken with: MTH 060 or higher or minimum placement Math Level 10.

Studies the theory, operation, diagnosis and repair of the modern braking systems of both domestic and import vehicles. Includes an introduction to anti-lock brake systems.

**AUT 211 ASE Test Prep I (1 Credit)**

**Recommended preparation:** completion of two terms of Automotive Technology curriculum and WR 60.

This self-paced, program-specific course allows the student to study in preparation for the ASE A1-A5 areas.

**AUT 212 ASE Test Prep II (1 Credit)**

**Recommended preparation:** completion of two terms of Automotive Technology curriculum and WR 60.

This self-paced, program-specific course allows the student to study in preparation for the ASE A6-A8 areas.

**AUT 216 Co-op Work Experience Automotive (1-4 Credits)**

**Prerequisites:** completion of two terms of Automotive Technology curriculum.

Provides an environment in which students can begin to recognize their strengths and limitations in their chosen career. The student is placed in an actual job environment where pressure, production and personalities are experienced. Cooperative Work Experience is a program requirement for students in the Automotive Technology program. Two CWE sections are required for the student who will achieve the Master Automotive Technician Certificate.

**AUT 216A CWE Automotive A (4 Credits)**

**Prerequisites:** instructor approval.

**Recommended preparation:** at least 24 credits of automotive courses.

The student is provided with the environment in which he/she can begin to recognize his/her strengths and limitations in their chosen career. The student is placed in an actual job environment where the experiences of pressure, production, and personalities are experienced. Cooperative Work Experience, is a program requirement for students in the Automotive Technology Program. Two CWE sections are required for the student who will achieve the Master Automotive Technician Certificate. 4 credits per section (144 hours).

**AUT 216B CWE Automotive B (4 Credits)**

**Prerequisites:** instructor approval.

**Recommended preparation:** at least 24 credits of automotive courses.

The student is provided with the environment in which he/she can begin to recognize his/her strengths and limitations in their chosen career. The student is placed in an actual job environment where the experiences of pressure, production, and personalities are experienced. Cooperative Work Experience, is a program requirement for students in the Automotive Technology Program. Two CWE sections are required for the student who will achieve the Master Automotive Technician Certificate. 4 credits per section (144 hours).

**AUT 251 Automatic Transmissions - Rebuild (3 Credits)**

**Prerequisites:** AUT 101, AUT 106, AUT 107, AUT 110 and AUT 115.

Provides an understanding of the basic principles and theory of planetary gear sets, torque converters and hydraulic controls as applied to automatic transmissions. Includes construction, operation and overhaul of current transmission types with emphasis on diagnosis, service and procedures to conform to current service manuals. A self-paced course.

**AUT 253 Automotive Air Conditioning (3 Credits)**

**Prerequisites:** AUT 102.

**Recommended preparation:** or to be taken with: MTH 060 or higher or minimum placement Math Level 10.

A hands-on study of automotive air conditioning and heating systems, concurrent with EPA Recovery Requirements for R-12, R-134a systems, diagnosis and service. A study of advanced electrical systems found on late-model vehicles.

**AUT 256 Automatic Transmissions Theory (2 Credits)**

This course is instructor lead which includes; principles and theory of planetary gear sets, torque converters, and hydraulic controls as applied to automatic transmissions. Includes emphasis on diagnosis, service, and procedures to conform to current service manuals. The student will also be introduced to Constant Velocity Transmissions/Hybrid Electric Vehicles/Electric Vehicle type transmissions.

**AUT 260 Diesel Performance II (4 Credits)****Prerequisites:** AUT 105 and AUT 206.

This is the second part of a diesel performance sequence. This course will provide the operational principles and theory of: Hydraulically actuated Electronically controlled Unit Injection **\*\***(HEUI) systems, the Electronic Unit Injection **\***(EUI) systems, and the Common Rail (CR) systems, as they are applied to Diesel Engine Performance. The course will include, in depth, Controller Area Networking (CAN),multiplexing, Controller Area Networking (CAN C) language (J1939 protocol), Software Updates, (J2534 re-flash), Vehicle Communication Interface (VCI), Selective Catalytic Reduction (SCR), Exhaust Gas Recirculation (EGR) systems, Variable Geometry Turbo-chargers (VGT), Constant Geometry Turbo-chargers (CGT) systems, Diesel Particulate Filter (DPF) variations, Diesel Oxidation Catalyst (DOC) systems, and diagnostic strategies, that will lead to accurate conclusions. The student will be exposed to multiple vehicle product lines during this course and,will be introduced to the proper techniques and procedures to repair them.

**AUT 270 Automotive Controller Systems I (4 Credits)****Prerequisites:** AUT 206.

Technological advancements in modern vehicles have changed how we perform diagnosis. This course examines various methods of those enhancements of automotive drive systems, with major emphasis on electronic programing, and how to accurately repair them, using computers and scan tools. This course will require the student technician to build on current diagnostic routines into advanced applications.

**AUT 271 Automotive Controller Systems II (4 Credits)****Prerequisites:** AUT 206.**Recommended preparation:** AUT 270.

Vehicle performance is enhanced by a variety of methods. This course examines various methods of performance enhancements of automotive drive systems with major emphasis on electronic programing. Manufacturer scan tools will be included with vehicle testing.

**AUT 280 Hybrid Electric Vehicles I (4 Credits)****Prerequisites:** AUT 206.

A study of HEV (hybrid electric vehicles) and EV (electric vehicles). Safety procedures will be strongly emphasized. Vehicle systems that will be covered: Hybrid safety and service procedures, introduction to hybrid batteries and service, introduction to hybrid electric motors, generators, and controls, regenerative braking systems, introduction to hybrid vehicle transmissions and transaxles, hybrid vehicle heating and air conditioning, first responder safety and procedures, introduction to manufacturer scan tools, hybrid vehicle diagnostic trouble codes.

**AUT 281 Hybrid Electric Vehicles II (4 Credits)****Prerequisites:** AUT 206.**Recommended preparation:** AUT 280.

A study of HEV (hybrid electric vehicles) and EV (electric vehicles) part 2. Safety procedures will be strongly emphasized. Vehicle systems that will be covered include: Hybrid safety and service procedures, advanced hybrid batteries testing and service, advanced testing of hybrid electric motors, generators, and controls along with extensive manufacturer scan tools use and vehicle testing.

**AUT 288 Special Studies: Automotive Technology (1-4 Credits)**

Explores topics of current interest in the automotive discipline.

**AUT 298 Independent Study: Automotive Technology (1-4 Credits)****Prerequisites:** Instructor approval required.**Recommended preparation:** Prior coursework in the discipline.

Individualized, advanced study in automotive technology to focus on outcomes not addressed in existing courses or of special interest to a student. P/NP grading.

**AUT 299 Selected Topics: Automotive (1-4 Credits)**

This course is in development.