

AUTOMOTIVE (AUT)

AUT 103 Automotive Engines

7 Class Hours, 7 Quarter Credit Hours

This course is the study of two- and four-cycle internal combustion engine operation and design. Topics covered are engine identification, internal components, cooling systems, lubrication systems and preliminary diagnosis of internal noises and excessive smoke. The course begins with discussions of internal failures and moves to practice with engine precision measurement and in-car repairs. In-depth discussions will focus on sealing techniques and engine breathing requirements. The course then progresses to in-car repairs including timing belts and water pumps. Students will study engine fasteners and fastening techniques. In-depth discussions will focus on sealing techniques and engine breathing requirements.

AUT 104 Automotive Engines Lab

8 Lab Hours, 2 Quarter Credit Hours

Students will practice compression and vacuum testing, oil pressure and cooling system examination. Students will learn to identify different engine configurations through the use of VIN or model numbers and will practice finding specifications in service manuals or by using computerized information systems. Students will practice disassembly of major components and replacement of cylinder head gaskets, water pumps, timing belts and intake manifold gaskets.

AUT 105 Automotive Electricity and Electronics

7 Class Hours, 7 Quarter Credit Hours

This course is a study of the fundamental theory and application of electrical and electronic principles in the automotive industry. Topics covered include principles of electricity, electrical test equipment, circuit construction, electrical and electronic components, wiring diagrams, basic troubleshooting techniques, starting and charging systems, gauges and sending units, power accessories and supplemental restraint systems. Upon completion, students will be able to properly use electrical testing equipment, wiring diagrams, diagnose, test, and repair electrical concerns. In addition to the subject matter, this course is designed to encourage teamwork, written and verbal communications and critical thinking skills.

AUT 106 Automotive Electricity and Electronics Lab

8 Lab Hours, 2 Quarter Credit Hours

In the lab, students will learn the use of multimeters and other test equipment. Students will also build, diagnose and repair electrical circuits and components. Topics covered include electrical test equipment, circuit construction, electrical and electronic components, wiring diagrams, basic troubleshooting techniques, starting and charging systems, gauges and sending units, power accessories and supplemental restraint systems. Upon completion, students will be able to properly use electrical testing equipment, wiring diagrams, diagnose, test, and repair electrical concerns. In addition to the subject matter, this course is designed to encourage teamwork, written and verbal communications and critical thinking skills.

AUT 107 Automotive Brakes, Suspension and Steering

8 Class Hours, 8 Quarter Credit Hours

This course covers the principles of operation of drum and disc braking systems. Students will study hydraulic principles, brake inspection, brake bleeding, brake system flushing, and machining practices. This course also introduces students to automotive frame systems, tires, wheels, suspension components and suspension inspection and alignment. Students will study steering system inspection and service and suspension system component identification, removal and repair.

AUT 109 Automotive Brakes, Suspension and Steering Lab

8 Lab Hours, 4 Quarter Credit Hours

The brake portion of the course covers the principles of operation, servicing and the diagnosing of drum, disc, parking, power assist and anti-lock braking systems. The steering and suspension portion of the course introduces students to automotive frame systems, tires, wheels, suspension components and suspension inspection and alignment. Students will study steering system inspection and service and suspension system component identification, removal and repair.

AUT 209 Automotive Fuel and Ignition Systems

8 Class Hours, 8 Quarter Credit Hours

Prerequisites: AUT 103 and AUT 104 and AUT 105 and AUT 106 and TT 106

Corequisites: AUT 210

Students are introduced to the air and fuel requirements of the internal combustion engine. Storage tanks, lines and fittings, electric/mechanical fuel pumps, electronic fuel injection, and carburetor theory and operation will be discussed as well as all related components. The computer network and scan tool operation as it applies to the fuel system will also be discussed. Students are also introduced to the diagnosis and repair of advanced electronic and computerized ignition systems found on the modern day internal combustion engine. They will study the components and operation of the engine management system used on today's cars.

AUT 210 Automotive Fuel and Ignition Systems Lab

12 Lab Hours, 4 Quarter Credit Hours

Prerequisites: AUT 103 and AUT 104 and AUT 105 and AUT 106 and TT 106

Corequisites: AUT 209

Students will practice fuel tank removal and installation and fuel pump removal and installation. They will also practice the diagnosis and repair of all types of electronic fuel injection. Routine service procedures, i.e. fuel injection cleaning/de-carbonizing, will also be practiced. Students will be required to use state-of-the-art tools and service equipment commonly used in the trade. Students will also practice scan tool operation and use these and other common tools and diagnostic equipment to troubleshoot and service modern ignition and fuel systems.

AUT 211 Automotive Powertrains

8 Class Hours, 8 Quarter Credit Hours

Prerequisites: TT 106 and AUT 105 and AUT 106

Corequisites: AUT 219

Students will study the design and theory of operation of automatic and manual front and rear wheel transmissions and transaxles. Students will be able to identify all of the component parts within the transmission as well as be able to demonstrate an ability to correctly explain the operating principles of each assembly.

AUT 219 Automotive Powertrains Lab

8 Lab Hours, 2 Quarter Credit Hours

Prerequisites: TT 106 and AUT 105 and AUT 106

Corequisites: AUT 211

Students will practice disassembly and reassembly of front and rear wheel drive automatic transmissions and transaxles. Students will also demonstrate an ability to correctly identify rear end, final drive, driveshaft, and drive axle service and maintenance procedures.

AUT 221 Advanced Technologies/Hybrid

8 Class Hours, 8 Quarter Credit Hours

Prerequisites: TT 106 and (AUT 103 and AUT 104) and (AUT 105 and AUT 106) and (AUT 209 and AUT 210)

Corequisites: AUT 222

This course will cover the complete computerized engine management systems (i.e., ignition, fuel, and emissions) and self-diagnostics. OBD II (on-board diagnostics generation 2) and drive-cycle monitors will be discussed, as well as advanced testing procedures using lab scopes, scan tools and other tools and equipment common to the repair and service trade. This course will also cover the theory and operation of hybrid/electric vehicles and advanced technologies, such as start-stop and autonomous driving systems. Safety procedures and common services to hybrid/electric vehicles will be discussed as well as specific tool usage as they pertain to high voltage systems.

AUT 222 Advanced Technologies/Hybrid Lab

12 Lab Hours, 4 Quarter Credit Hours

Prerequisites: TT 106 and AUT 103 and AUT 104 and AUT 105 and AUT 106 and AUT 209 and AUT 210

Corequisites: AUT 221

This course will cover the complete computerized engine management systems (i.e., ignition, fuel, and emissions) and self-diagnostics. OBD II (on-board diagnostics generation 2) and drive-cycle monitors will be discussed, as well as advanced testing procedures using lab scopes, scan tools and other tools and equipment common to the repair and service trade. This course will also cover the theory and operation of hybrid/electric vehicles and advanced technologies, such as start-stop and autonomous driving systems. Safety procedures and common services to hybrid/electric vehicles will be discussed as well as specific tool usage as they pertain to high voltage systems.

AUT 234 Automotive Engineering

3 Class Hours, 2 Lab Hours, 4 Quarter Credit Hours

Prerequisites: PHY 200 or PHY 126

This project-based course applies the principles of physics to the major systems of automobiles. Students will use numerical, analytical, and graphical approaches to analyze systems and develop hardware and/or simulations to demonstrate the underlying physics principles.

AUT 251 Internship/Practical Experience

20 Lab Hours, 4 Quarter Credit Hours

This course is designed for students who have completed the majority of their automotive studies and wish to hone their skills in the work environment. Employers will be matched with students based on interest/ability levels to assist students to improve their mechanical skill in the work environment.

AUT 262 Introduction to Hybrid Vehicles

1 Class Hours, 3 Lab Hours, 2 Quarter Credit Hours

Prerequisites: (AUT 105 and AUT 106)

This course will cover the theory and operation of hybrid electric vehicles. While this course will focus on hybrid electric vehicles, different types of alternative fuel vehicles will be introduced as well. Safety procedures and common services to hybrid electrics will be discussed as well as specific tool usage as they pertain to high voltage systems.

AUT 265 OEM Factory Training Seminar

1 Class Hours, 3 Lab Hours, 2 Quarter Credit Hours

Prerequisites: TT 106 and AUT 103 and AUT 104 and AUT 106 and AUT 107 and AUT 109

Upon completion of this course, students will have the ability to explain and demonstrate maintenance procedures and light repair on Ford, Chrysler or Subaru vehicles in accordance with OEM practices.

AUT 271 Introduction to High Performance Vehicles

6 Class Hours, 6 Quarter Credit Hours

Prerequisites: AUT 209 and AUT 210

This course will cover an introduction to horsepower, airflow through an engine and exhaust systems. Dynamometer testing of vehicles prior to modification will be discussed and practiced as well as modifications which can be made to most vehicles. Students will practice testing vehicles, making engine, exhaust and suspension modifications and retesting vehicles to measure results.

AUT 276 Light Duty Diesel Diagnostics and Repair

1 Class Hours, 3 Lab Hours, 2 Quarter Credit Hours

Prerequisites: TT 106 and AUT 103 and AUT 104 and AUT 105 and AUT 106

This course covers the principles of operation of light duty diesel vehicles. The course will focus on: basic diesel operation, preventive maintenance, high and low-pressure fuel systems, high and low pressure lubricating systems, intake and exhaust systems and emission controls. Content learned in the classroom will be applied in the lab.

AUT 277 Vehicle Service Practices with Career Preparation

1 Class Hours, 3 Lab Hours, 2 Quarter Credit Hours

Prerequisites: AUT 103 and AUT 104 and AUT 105 and AUT 106 and AUT 107 and AUT 109

This course will review and expand on basic shop skills that entry-level automotive technicians will be expected to perform. Students will review skills taught in previous terms and bring their proficiency up to new levels. While there will be some classroom instruction, the main focus will be hands-on work in the lab.

AUT 278 Introduction to High Performance Vehicles Lab

4 Class Hours, 4 Lab Hours, 6 Quarter Credit Hours

Prerequisites: AUT 209 and AUT 210

Students will practice testing vehicles, making engine, exhaust and suspension modifications and retesting vehicles to measure results.

AUT 280 Advanced Troubleshooting

1 Class Hours, 3 Lab Hours, 2 Quarter Credit Hours

Prerequisites: AUT 103 and AUT 104 and AUT 209 and AUT 210

This course is designed for students who have completed the majority of their automotive studies and want to hone their diagnostic skills. This course is lab-based and focuses on automotive drivability problems and will consist of a large amount of hands-on practical problems.

AUT 285 Automotive Heating and Air Conditioning Systems

2 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

This course will cover the basic physics concepts of heating, cooling heat transfer and phase changes. It will apply this knowledge to the understanding of engine cooling systems, heating systems and air conditioning systems. Students will apply this knowledge in the lab in the testing and servicing of these systems.

AUT 302 Service Management Operations

3 Class Hours, 2 Lab Hours, 4 Quarter Credit Hours

High-quality service operations require effective management teams. This course gives students an understanding of management operations of today's high performing dealerships. Students study time management, benchmarking and best practices, internal operations, compensation management and physical operations as well as insurance issues faced in the automotive environment. Students work in teams and role-play to learn the concepts of leadership through motivation.

AUT 306 Environmental Health and Safety

3 Class Hours, 3 Quarter Credit Hours

This course covers the responsibilities of the service department to provide their employees with Right-to-Know training and Hazardous Materials Communication. Students learn the governmental requirements for Right-to-Know training and practice developing a hazard communication plan for a small service business.

AUT 321 Industry Software Applications

3 Class Hours, 2 Lab Hours, 4 Quarter Credit Hours

Students are introduced to industry software applications such as AutoMate and Mitchell Manager to track work orders, customer service intervals, recalls, and warranty updates. Students practice communications with consumers as well as other departments within the dealership, and create a customer database for mailings, service reminders, and recall information. Students also prepare reports to monitor technician efficiency and profitability. Additionally, students track expenses and performance of the service department.

AUT 404 Legal Issues and the Dealership

3 Class Hours, 3 Quarter Credit Hours

This course focuses on the legal aspects of running a service department. Such topics as signatures on repair orders, mechanic's liens, and lemon laws are discussed. Students research current practices and develop an outline of service department best practices.

AUT 410 Senior Internship

20 Lab Hours, 5 Quarter Credit Hours

Students spend 20 hours per week at their internship placement honing their skills under the supervision of a job site mentor. Students have an active role in the scheduling of work for technicians and the interaction with the customers. Students meet periodically with the internship advisor to discuss their work experiences. Students complete a writing project evaluating their experiences and will present this report to the faculty and their classmates at the completion of the term.

AUT 415 Warranty Administration and Parts Inventory

4 Class Hours, 4 Quarter Credit Hours

Managing the warranty administration process and service parts inventory effectively is critical to customer satisfaction and profitability. Warranty administration requires detailed tracking and conformance to unique manufacturer policies for claims to be approved and paid for by the manufacturer. Attention to detail and strong business to business communication skills are essential to successful claims processing. Effective inventory management requires analysis of just in time purchasing, economic order quantities, and matrix pricing. Warranty administration and inventory management represent significant cost centers and revenue streams for the service department and dealership overall.