COURSE OUTLINE

Course Number: AUT 112
Course Title: Automotive Fuel Systems
Credits: 3

Hours: 2/3
Co- or Pre-requisite: AUT 110 and AUT 111
Implementation: Fall 2020

Catalog description (as it appears in 2020-2021 edition):
An examination of gasoline and diesel automotive fuel systems. Lessons include fuel basics, electronic fuel injection systems, gasoline direct injection, diesel fuel delivery systems, and On-Board Diagnostics II (OBD II). Lessons focus on theory of operation, driveability diagnostic procedures, and the use of diagnostic equipment.

Is course New, Revised, or Modified? Revised


Revision date: Spring 2020
Course coordinator: Jason Evans evansj@mccc.edu, ext. 3776

Information resources: DealerConnect web-site, service manuals, Subaru of America resources, online and self-study courses and the AllData online service information database

Other learning resources: (Describe any other student learning resources that are specific to this course, including any special tutoring or study group support, learning system software, etc.)

Course Competencies/Goals:

The student will be able to:
1. Understand the qualities, use, and production of conventional and alternative petroleum-based fuel sources used in current passenger vehicle
2. Obtain service and repair information and procedures from the appropriate online service information database using the computers found in the automotive facility.
3. Identify the proper tools and procedures to test fuel systems for malfunctions and normal operation
4. Reference Parameter Identification Data (PID) and Mode 6 data to determine faults in the fuel management systems
5. Demonstrate an understanding of the proper use of diagnostic scan tools by successfully retrieving control module diagnostic trouble codes and sensor information.
6. Demonstrate an understanding of the types of fuel management systems used on current vehicles by answering questions on a test or quiz.
7. Given a live vehicle with a driveability concern, successfully diagnose the cause of the concern and return the vehicle to normal operation.
8. Demonstrate an understanding of the OBD II Emission Control requirements by successfully answering questions on a test or quiz.

Course-specific Institutional Learning Goals (ILGs)/General Education Goals.

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.
Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.
Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Units of study in detail.

Unit I: Types of Fuels and Fuel Production
The student will be able to:

- Describe the production process of conventional and alternative fuels (Course Competency 1; ILG 1)
- Verbally and in writing, define terminology related to different fuel motor types (Course Competency 1; ILG 1)
- Identify vehicle driveability concerns related to fuel quality and contamination (Course Competencies 1, 3, & 6; ILGs 1, 4, 10, &11)
- Describe characteristics of motor fuels by successfully answering questions on tests, quizzes, and student lab activities (Course Competency 1)

Unit II: The Basic Operation of the Gasoline Engine Fuel System
The student will be able to:

- Demonstrate his/her understanding of the types of fuel systems used on current gasoline engine vehicles by successfully answering questions on a test, quiz, or student activity sheet (Course Competencies 5 & 6; ILG 1)
- Identify the types of vehicle emissions, how they are produced and their effects on the environment, both verbally or written on a test (Course Competency 7; ILG 1)
- Describe the advantages of using a computer controlled fuel management system, both verbally or written on a test (Course Competencies 5 & 7; ILG 1)

Unit III: Gasoline Fuel System Management: Speed Density (MAP) and Mass Air Flow (MAP)
The student will be able to:

- Identify and describe the different types of electronic gasoline fuel management systems used on modern gasoline vehicles, both verbally or written on a test (Course Competency 5; ILGs 1 & 4)
- Describe the flow and function of the gasoline fuel delivery system components by successfully answering questions on a test (Course Competencies 2, 5, & 6; ILGs 4 & 10)
- Using one of the program vehicles, test the gasoline fuel management systems for proper mechanical and electronic operation (Course Competencies 3, 4, & 5; ILGs 4 & 10)
Use an electronic computerized scan tool to interpret the signals generated by the various input sensors as displayed by these tools (Course Competencies 4 & 5; ILG 4)

Unit IV: The Basic Operation of the Diesel Fuel System
The student will be able to:
- Explain the differences among diesel fuel delivery systems designs verbally and in written format (Course Competency 6; ILGs 1 & 10)
- Describe the operation of diesel fuel system components (Course Competency 6; ILG 1)
- Use an electronic diagnostic scan tool to interpret fuel delivery sensor inputs to the engine control module (Course Competencies 4 & 8; ILGs 4 & 10)
- Use online service information to properly diagnose electrical and mechanical malfunctions in diesel fuel systems (Course Competency 5; ILGs 4,10, & 11)
- Demonstrate proper service, maintenance, and repair procedures for diesel fuel systems in the automotive lab (Course Competencies 2 & 3)

Unit V: Diesel Fuel Systems Management: Mechanical and Electronic Control Systems
The student will be able to:
- Identify and describe the different types of electronic diesel fuel management systems used on modern diesel passenger vehicles, both verbally or written on a test (Course Competency 5; ILGs 1 & 4)
- Describe the flow and function of the diesel fuel delivery system components by successfully answering questions on a test (Course Competencies 2, 5, & 6; ILGs 4 & 10)
- Using one of the program vehicles, test the diesel fuel management systems for proper mechanical and electronic operation (Course Competencies 3, 4, & 5; ILGs 4 & 10)
- Use an electronic computerized scan tool to interpret the signals generated by the various input sensors as displayed by these tools (Course Competencies 4 & 5; ILG 4)

Unit VI: On-Board Diagnostics II (OBD II)
The student will be able to:
- Demonstrate understanding of OBD II requirements as dictated by state and federal laws (Course Competency 8; ILG 1)
- Explain the major differences and advantages of OBD II systems when compared to OBD I systems or primitive systems that do not use computer controls (Course Competency 8; ILG 1)
- Be able to check OBD II monitor status using a diagnostic scan tool (Course Competency 4; ILG 4)
- Using a diagnostic scan tool on an OBD II vehicle, retrieve diagnostic trouble codes (DTC’s) and demonstrate a basic diagnostic strategy for a fuel systems related driveability concern (Course Competencies 4, 5, & 7; ILGs 4, 10, & 11)
**Policy Statement for Missed Lab and Equipment Demonstrations:**

Due to the technical nature of the Automotive Program and hazards involved with the use of specialty tools and equipment, a student that is absent from lab instruction, where demonstrations are performed by the course instructor, will not be permitted to complete the related lab work upon their return. This includes full-day absences and partial-day absences that result in missing the lab demonstration(s). Enforcement of these policies will be at the discretion of the course instructor.

**Evaluation of student learning:**

Students are evaluated using weekly quizzes, a mid-term exam, a final exam, graded homework assignments, and hands-on work assignments in the automotive laboratory. Students are expected to read the assigned textbook chapters, handouts, and manufacturers’ training material (if applicable) at appropriate times throughout the course.

Please note that:
- Any student who scores below a 60% (D) on the final exam must repeat the course
- AUT 112 is a prerequisite course to AUT 211. Therefore, a minimum course grade of 70% (C) is needed to pass AUT 112.
- Students enrolled in the Mopar Career Automotive Program (Mopar CAP) must complete all course-related Fiat Chrysler Automobiles (FCA) web courses and post-tests assigned at the start of the semester. The Mopar CAP requirements are in addition to the requirements stated above.

**Academic Integrity Statement:**

A student who knowingly represents the work of others as his/her own, uses or obtains unauthorized assistance in the execution of any academic work, gives fraudulent assistance to another student, or inappropriately or unethically uses technological means for academic gain is guilty of cheating. Submitting your own work from a previous course without the permission of your current course instructor is also deemed an academic integrity violation (See Student Handbook). Any student who violates this policy is subject to receive a failing grade for the assignment and will be reported to the Office of Student Affairs for further disciplinary action. Possible dismissal from the course could result.

**Reasonable Accommodations for Students with Documented Disabilities**

Mercer County Community College is committed to supporting all students in their academic and co-curricular endeavors. Each semester, a significant number of students document disabilities, which may require learning, sight, hearing, manual, speech, or mobility accommodations to ensure access to academic and co-curricular activities. The college provides services and reasonable accommodations to all students who need and have a legal entitlement to such accommodations.

For more information regarding accommodations, you may visit the Office of Academic Support Services in FA129 or contact them at 609.570.3422.

Mercer County Community College is in compliance with both the ADA and section 504 of the Rehabilitation Act. If you have, or believe you have, a differing ability that is protected under the law, please see Arlene Stinson in LB216, at 609-570-3525 or at stinsona@mccc.edu for information regarding support services.