



**AUT 128
FUEL, IGNITION, AND EMISSION SYSTEMS
COURSE SYLLABUS**

****Instructors will provide students with additional course-specific information, including attendance/makeup policies, assignment/test scheduling, and instructor contact information, as necessary and appropriate.****

Prerequisite(s): AUT 120, AUT 122

Corequisite(s): None

Quarter(s) Offered: All

Class Hours: 5

Lab Hours: 6

Credit Hours: 7

Course Description: Introduces fuel, ignition, and exhaust systems theory, diagnosis, repair, and service for vehicles with carburetor and fuel injection systems. Topics include: general engine diagnosis; ignition system diagnosis and repair; fuel, air induction, and exhaust systems diagnosis and repair; positive crankcase ventilation; exhaust gas recirculation; engine related service.

Student Learning Outcomes: Upon successful completion of this course, the student should be able to:

General Engine Diagnosis

- Interpret and verify engine concern; determine necessary action.
- Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
- Diagnose unusual engine noise or vibration concerns; determine necessary action
- Diagnose unusual exhaust color, odor, and sound; determine necessary action
- Perform engine absolute (vacuum/boost) manifold pressure test; determine necessary action
- Perform cylinder balanced test; determine necessary action
- Perform cylinder compression test; determine necessary action
- Perform cylinder leakage test; determine necessary action

- Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and engine diagnostic equipment; determine necessary action
- Repair four or five gas analyzers; inspect them prepare vehicles for test, and obtain exhaust readings; interpret readings, and determine necessary action

Ignition System Diagnosis and Repair

- Diagnose no-starting, drivability, and ignition concerns a vehicle with electronic ignition (EI/DIS) (distributorless) systems; determine necessary action.
- Diagnose no-starting, driveability, and emissions concerns on vehicles with distributor ignition (DI) systems; determine necessary action.
- Inspect and test ignition primary circuit wiring and components; perform necessary action.
- Inspect and test distributor; perform necessary action.
- Inspect and test ignition system secondary circuit wiring and components; perform necessary action
- Inspect and test ignition coil(s); perform necessary action
- Check and adjust (where applicable) ignition system timing and timing advance/retard
- Inspect and test ignition system pick-up sensor or triggering devices; perform necessary action
- Inspect and test ignition control module; perform necessary action

Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair

- Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling poor mileage, dieseling, and emissions problems on vehicles with carburetor-type fuel systems; determine necessary action
- Inspect fuel tank and fuel cap, fuel lines, fittings, and hoses; perform necessary action
- Check fuel for contaminants and quality; determine necessary action
- Inspect and test mechanical and electrical fuel pumps and pump control systems; perform necessary action
- Replace fuel filters
- Inspect and test fuel pressure regulation system and components; perform necessary action
- Inspect and test cold enrichment system and components; perform necessary action
- Remove, service, and install throttle body; adjust related linkages
- Inspect, test, and clean fuel injectors
- Inspect throttle body mounting plates, air induction and filtration system, intake manifold, and gaskets; perform necessary action
- Check idle speed and fuel mixture
- Adjust idle speed and fuel mixture
- Remove, inspect, and test vacuum and electrical circuits, components and connections of fuel system; perform necessary action
- Inspect exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action
- Perform exhaust system back-pressure test; determine necessary action

- Test the operation of turbocharger/supercharger systems; determine necessary action

Positive Crankcase Ventilation

- Diagnose oil leaks, emissions, and driveability problems resulting from failure of the positive crankcase ventilation (PCV) system; determine necessary action
- Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action

Exhaust Gas Recirculation

- Diagnose emissions and driveability problems caused by failure of the exhaust gas recirculation (EGR) system; determine necessary action
- Inspect and test valve, valve manifold, and exhaust passages of exhaust gas recirculation (EGR) systems; perform necessary action
- Inspect and test vacuum/pressure controls, filters, and hoses of exhaust gas recirculation (EGR) systems; perform necessary action
- Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action

Engine Related Service

- Adjust valves on engines with mechanical or hydraulic lifters
- Verify correct camshaft timing; determine necessary action
- Verify engine operating temperature; determine necessary action
- Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap coolant recovery tank, and hoses; perform necessary action
- Inspect and test thermostat, by-pass, and housing; perform necessary action
- Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action

Grading Scale: The grading scale is detailed in the *Catalog and Student Handbook* and listed below for reference. All faculty members follow this scale when assigning grades to reflect a given student's performance in the classroom.

| Grade | Numerical Equivalent | Grade Point |
|-------|----------------------|-------------|
| A/A* | 90-100 | 4 |
| B/B* | 80-89 | 3 |
| C/C* | 70-79 | 2 |
| D/D* | 60-69 | 1 |
| F/F* | 0-59 | 0 |

Effective Summer Quarter 2006, Athens Technical College replaced the S/U grading system used for learning support classes with an A*-F* grading system. The registrar uses an asterisk (A*, B*, C*, D*, F*, W*, WF*, WP*) to designate learning support course grades on transcripts and grade reports because these grades are not components of the quarterly grade point average.

Required Textbook(s), including ISBN:

Title: *Modern Automotive Technology 7/e*
Author: Duffy (2009)
Publisher: Goodheart Wilcox.
ISBN: 978-1-59070-956-6

Supplementary Material(s): None

Required Equipment/Tools/Resources: Required Tool List will be provided by instructor

Instructional Technologies Employed: The primary method of instruction for this course will be lecture, reading assignments, demon-strations, video presentations, and practical applications that include live lab experience.

Attendance: Regular class attendance is important and expected. The college considers both tardiness and early departure from class as forms of absenteeism. Students absent from class for any reason are still responsible for all work missed. Instructors have the right to determine whether work missed can be made up and have the liberty to set reasonable expectations for attendance **based on frequency of class meetings and on the instructional delivery method, subject, type, and level of the class**. Class attendance policies will be clearly stated for students by their respective instructors on separate documents (course outlines/schedules) or appendices to the master syllabus.

Grading Policy and Criteria: Grade distribution will be determined as follows:

Unit Exam Average: 33%
Lab Evaluation: 33%
Final Exam: 33%

Work Ethics: To fulfill the responsibility to teach essential workplace ethics, the college evaluates program students on attendance, character, teamwork, appearance, attitude, productivity, organizational skills, communication, cooperation, and respect. Because students are preparing for employment, it is essential that they become accustomed to standards of behavior in the workplace. At the conclusion of the quarter, faculty members assign separate numerical work ethics grades which appear beside the course letter grades on both transcripts and grade reports. The work ethics grading scale is as follows: 3 (Exceeds Expectations), 2 (Meets Expectations), 1 (Needs Improvement), and 0 (Unacceptable).

Academic Honesty: Academic honesty is expected at all times. Any student found to have engaged in academic misconduct such as cheating, plagiarism, or collusion is subject to disciplinary sanctions as outlined in the Student Code of Conduct detailed in the *ATC Catalog and Student Handbook*. The term “plagiarism” includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. The term “collusion” includes, but is not limited to, the unauthorized collaboration with any other person in preparing work offered for academic credit. Students are advised that faculty routinely use **turnitin.com** both to prevent plagiarism and to assist in verifying when/if it has occurred.

Course Withdrawal: Students may withdraw from a course without academic penalty until the midpoint of the quarter (as stated in the Academic Calendar published in the *ATC Catalog and Student Handbook*). By withdrawing before the midpoint of the quarter, the student is automatically assigned a grade of W, which does not affect quarterly or cumulative grade point average. Grades of W will affect satisfactory academic progress for financial aid purposes. **Students who stop attending class(es) without formally withdrawing risk earning a final grade of F, which will appear on the academic transcript.** Refer to the *ATC Catalog and Student Handbook* for further details.

Academic Support Center: The Academic Support Centers of Athens Technical College (ATC) provide free tutoring for enrolled students. Both instructors and peer tutors provide tutoring in almost all subjects offered by the college. Information about the Center is accessible via the ATC website at www.athenstech.edu. To find out the specific services available on the Athens, Greene, and Walton Campuses, please call (706) 583-2839. To contact the Academic Support Center on the Elbert County Campus, please call (706) 213-2129.

Americans with Disabilities Act: Any student who believes he/she is eligible for accommodations in the classroom and/or during testing due to a documented disability is encouraged to contact the Director of Student Support Services at (706) 355-5081, or the Coordinator of Disability Services at (706) 355-5006, to apply for assistance. It is our goal at Athens Technical College to provide equal access to education for all students.

Cell Phones and Electronic Devices: Students are strictly prohibited from using cell phones and personal electronic devices within college-owned/operated facilities without the explicit permission of a faculty or staff member.

Food/Drinks in Classroom: Food and beverages (other than water) are not allowed in classrooms/labs.

Warranty of Graduates: The Department of Technical and Adult Education warrants every graduate of technical programs in which students may earn technical certificates of credit, diplomas, or associate degrees. The warranty guarantees that graduates demonstrate the knowledge and skills and can perform each competency as identified in the industry-validated standards established for every program of study. If one of our graduates educated under a standard program or his/her employer finds that the graduate is deficient in one or more competencies as defined in the course/program standards, Athens Technical College will retrain the employee at no instructional cost to the employee or the employer. This guarantee is in effect for two years after graduation.

TEACH Act: According to the TEACH Act of 2002, Athens Technical College is obligated to advise you that instructional material included in this course may be subject to copyright protection. As such, you must not share, duplicate, transmit, or store the material of this course beyond the purpose and time frame explicitly stated in the syllabus of your course. If you are not certain whether a particular piece of material is covered by copyright protection, you

should contact your instructor and obtain his/her written clarification. Failing to observe copyright protection is a violation of law.