
Course Prefix/Number: AUT145
Course Title: Engine Performance
Lecture Hrs/Week: 2.0
Lab Hrs/Week: 3.0
Credit Hrs/Semester: 3.0

[Distance Learning Attendance/VA Statement](#)
[Textbook Information](#)

COURSE DESCRIPTION:

This course covers the diagnosis of various performance problems using the appropriate diagnostic equipment and reference/repair manuals.

COURSE COMPETENCIES:

Upon successful completion of this course, the student should be able to perform the following tasks.

Module 1 Valve Trains

1. Identify the components of a typical valve train.
2. Describe the operation of the valve train.
3. Set valve timing.
4. Degree camshafts.
5. Adjust hydraulic and mechanical valve lash.

Module 2 Ignition Systems

1. Describe the operation of the ignition system.
2. Set the timing on a non computer controlled ignition system.
3. Set base timing on a computer controlled ignition system.
4. Describe the operation of mechanical and vacuum advance systems.
5. Describe computer controlled spark advance.

Module 3 Oscilloscopes

1. Connect an oscilloscope to a distributor ignition system.
2. Connect an oscilloscope to a distributorless ignition system.
3. Identify the primary waveform.
4. Identify the secondary waveform.
5. Perform a cylinder balance test.

Module 4 Scanners

1. Connect a scanner to a computer controlled vehicle.
2. Insert vehicle information into the scanner.
3. Identify input sensors.
4. Identify output control devices.
5. Retrieve trouble codes.

PERFORMANCE OBJECTIVES:

Module 1 Valve Trains

1. Given an engine, the student will identify the components of a typical valve train according to NATEF standards.
2. Given an engine, the student will describe the operation of the valve train according to NATEF standards.
3. Given an engine, the student will set valve timing according to NATEF standards.
4. Given an engine, the student will degree camshafts according to NATEF standards.
5. Given an engine, the student will adjust hydraulic and mechanical valve lash according to NATEF standards.

Module 2 Ignition Systems

1. Given an engine, the student will describe the operation of the ignition system according to NATEF standards.
2. Given an engine, the student will set the timing on a non computer controlled ignition system according to NATEF standards.
3. Given an engine, the student will set base timing on a computer controlled ignition system according to NATEF standards.
4. Given an engine, the student will describe the operation of mechanical and vacuum advance systems according to NATEF standards.
5. Given an engine, the student will describe computer controlled spark advance according to NATEF standards.

Module 3 Oscilloscopes

1. Given a vehicle, the student will connect an oscilloscope to a distributor ignition system according to NATEF standards.
2. Given a vehicle, the student will connect an oscilloscope to a distributorless ignition system according to NATEF standards.
3. Given a vehicle, the student will identify the primary waveform according to NATEF standards.
4. Given a vehicle, the student will identify the secondary waveform according to NATEF standards.
5. Given a vehicle, the student will perform a cylinder balance test according to NATEF standards.

Module 4 Scanners

1. Given a vehicle, the student will connect a scanner to a computer controlled vehicle according to NATEF standards.
2. Given a vehicle, the student will insert vehicle information into the scanner according to NATEF standards.
3. Given a vehicle, the student will identify input sensors according to NATEF standards.
4. Given a vehicle, the student will identify output control devices according to NATEF standards.
5. Given a vehicle, the student will retrieve trouble codes according to NATEF standards.

TOPIC / CONTENT OUTLINE

Module 1 Valve Trains

1. Camshafts
2. Lifters

3. Pushrods
4. Rocker arms
5. Rocker arm ratios
6. Valves
7. Valve springs
8. Timing chains
9. Timing belts
10. Timing gears
11. Degree camshaft

Module 2 Ignition Systems

1. Ignition timing
2. Base timing
3. Computer controlled timing
4. Mechanical advance
5. Vacuum advance

Module 3 Oscilloscopes

1. Distributor ignition
2. Distributorless ignition
3. Primary waveform
4. Secondary waveform
5. Cylinder balance test

Module 4 Scanners

1. Vehicle Identification Numbers
2. Types of scanners
3. Input sensors
4. Output control devices
5. Trouble codes
6. Flow charts

METHODS OF INSTRUCTION

This course consists of two hours of classroom instruction and three hours of lab instruction. The classroom instruction includes lectures, discussions, problem solving sessions, and tests. The lectures are given while drawing on the blackboard, using overhead projections, videotapes, demonstrations, and other multimedia methods. The laboratory instruction includes proper safety procedures, instructions on the proper use of lab equipment, proper diagnosis of engine performance related problems, and hands on experience with live repair projects.

COURSE REQUIREMENTS

Students are responsible for attaining competencies through completion of the following course requirements:

ATTENDANCE:

Students will be bound by the policies stated in the York Technical College Student Handbook. Students must attend 90% of the hours assigned the class for a semester to receive credit for the course. In case a student does miss a class, the student is responsible for obtaining the

material that was covered during the absence. If a student is aware that a class will be missed, then the student should notify the instructor at the earliest possible date. Students with unexcused absences during tests will be allowed to make up tests at the discretion of the instructor. The student has the burden to be sure that some arrangement has been made with the instructor for taking a make-up test.

ACADEMIC HONESTY

York Technical College adheres to the South Carolina Tech Student code, approved by the State Board for Technical and Comprehensive Education on March 13, 1974(revised last April, 25 1984). Copies of this code are available in the Library and from Student Services. Any student involved in cheating or any other academic dishonesty will be given a grade of zero and will be subject to further disciplinary action. See the student handbook section “Student Life” subheading “Student Conduct” for further details.

PARTICIPATION IN CLASS

Students will be expected to participate in class discussions, to demonstrate problem solving techniques, to complete tests, homework, lab experiments, lab reports and other assigned work.

EVALUATION STRATEGIES/GRADING

The grading scale will be as follows:

Grade Points	
A	90-100
B	80-89
C	70-79
D	60-69
F	00-59

EVALUATION METHOD

Tests may be written or oral and may contain questions that are true or false, short answer, multiple choice, fill in the blank and/or problems. Students should refer to the instructor for the number of tests to be given and the material to be covered on each test. Each test will be of equal weight unless otherwise indicated by the instructor. Lab grades will be based on the completion of the Course Competencies, team work, safety, class participation, and housekeeping.

Final grades will be determined as follows:

Module 1	Test	8.25%
Module 1	Lab	16.75%
Module 2	Test	8.25%
Module 2	Lab	16.75%
Module 3	Test	8.25%
Module 3	Lab	16.75%

Module 4	Test	8.25%
Module 4	Lab	<u>16.75%</u>
Total Grade		100%

ENTRY-LEVEL SKILLS

Students should demonstrate hand eye coordination, manual dexterity, and be able to work in an industrial environment.

PREREQUISITES: None

CO-REQUISITES: None

Disabilities Statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Offices (SR) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.