

COURSE PREFIX/NO: **AUT 105**
COURSE TITLE: **BEGINNING ENGINE REPAIR**
LEC HRS/WEEK: **3.0**
LAB HRS/WEEK: **3.0**
CREDIT HRS/SEMESTER: **4.0**

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

COURSE DESCRIPTION

This course is a basic study of minor engine repairs, including in-frame repairs and cylinder head reconditioning.

COURSE COMPETENCIES

Upon successful completion of this course, the student should be competent to perform the following tasks:

Module 1. Safety

1. Review OSHA regulations.
2. Review proper technique to lift and hoist an engine.
3. Review the proper types of clothing to be worn in the shop including eye protection.
4. Review the different types of fire extinguishers and their location in the shop.
5. Discuss the safe and proper way to operate the vehicle lifts that are located in the shop.
6. Discuss the location of the light switches, exhaust fans, breaker box, and the first aid kit located in the automotive shop.

Module 2. Tools

1. Review the correct name and description of automotive tools.
2. Demonstrate the proper use of each tool.
3. Discuss tool maintenance.
4. Review the correct and safe way to use power tool.
5. Demonstrate the way to use precision tools including micrometers and torque wrenches.

Module 3. Engine Block Assembly

1. Review the parts of an engine.
2. Describe the operation of the four-cycle engine.
3. Inspect engine blocks for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action. (C2-P1)
4. Perform common fastener and thread repair to include, remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.(C3-P1)
5. Inspect and measure cylinder walls/sleeves for damage and wear; determine necessary action. (C4-P2)
6. Inspect crankshafts for end play, straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition, measure journal wear; check crankshaft sensor reluctor ring (where applicable); determine necessary action. (C7-P2)
7. Inspect, measure, and install piston rings. (C12-P2)

Module 4. Lubrication and Cooling Systems

1. Inspect oil pump gears and rotors, housing, pressure relief devices, and pump drive; perform necessary action. (D3-P1)
2. Inspect, test, and replace thermostat and gasket. (D6-P1)
3. Inspect, test, remove, and replace water pump.(D8-P1)
4. Perform oil and filter change.(D13-P1)
5. Perform oil pressure test; determine necessary action.(D1-P1)
6. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. (D4-P1)
7. Inspect and replace engine cooling and heater system hoses. (D5-P1)
8. Remove and replace radiator. (D9-P2)
9. Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; determine necessary action. (D3-P1)
10. Inspect, test, and replace oil temperature and pressure switches and sensors. (D12-P2)

Module 5. Cylinder Head and Valve Train

1. Visually inspect cylinder heads for cracks; check gasket surface areas for warpage and leakage; check passage condition. (B2-P2)
2. Remove and reinstall cylinder heads and gaskets; tighten to manufacturer's specifications and procedures. (B1-P1)
3. Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks, and valve grooves; determine necessary action. (B4-P2)
4. Check valve spring assembled height and valve stem height; determine necessary action. (B8-P3)
5. Inspect valve guides for wear; check valve guide height and stem to guide clearance; determine necessary action.(B5-P3)
6. Inspect valves and valve seats; determine necessary action. (B6-P3)
7. Resurface valve; perform necessary action.
8. Resurface valve seat; perform necessary action.
9. Check valve face-to-seat contact and valve seat concentricity (runout); determine necessary action. (B7-P3)
10. Adjust valves (mechanical or hydraulic lifters). (B11-P1)
12. Establish camshaft(s) timing and cam sensor indexing according to manufacturers specifications and procedures. (B16-P1)
13. Inspect and replace timing belts (chains), overhead camdrive sprockets, and tensioners; check belt/chain tension; adjust as necessary. (B13-P1)

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 80% 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 (last revised 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, teamwork, safety, class participation, and housekeeping.

Final grades will be determined as follows:

Module 1.	Tests	10%
Module 1.	Lab	10%
Module 2.	Test	10%
Module 2.	Lab	10%
Module 3.	Test	10%

Module 3.	Lab	10%
Module 4.	Test	10%
Module 4.	Lab	10%
Module 5.	Test	10%
Module 5.	Lab	10%
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 – RDG 100

TOPIC / CONTENT OUTLINE

Module 1. Safety

1. Proper clothing.
2. Safety glasses.
3. Fire extinguishers.
4. Engine hoists.
5. Vehicle lifts.
6. OSHA regulations.
7. Tool safety.

Module 2. Tools

1. Tool identification.
2. Tool safety.
3. Hand tools.
4. Power tools.
5. Precision tools.

Module 3. Engine Block Assembly

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| 1. Crankshafts | 8. Plastigauge |
| 2. Connecting rods | 9. Piston rings |
| 3. Pistons | 10. Oil pans |
| 4. Engine blocks | 11. Valve covers |
| 5. Camshafts | 12. Timing covers |
| 6. Lifters | 13. Vibration dampeners |
| 7. Bearings | |

Module 4. Lubrication and Cooling Systems

1. Radiators
2. Water pumps
3. Thermostats
4. Coolant hoses
5. Cooling fans
6. Antifreeze
7. Oil pumps
8. Oil passages
9. Oil filters
10. Engine oil

Module 5. Cylinder Head and Valve Train

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| 1. Types of cylinder heads. | 8. Camshafts |
| 2. Valves | 9. Timing chains |
| 3. Valve seats | 10. Timing belts |
| 4. Valve guides | 11. Timing gears |
| 5. Valve springs | 12. Lifters |
| 6. Retainers | 13. Pushrods |
| 7. Keepers | 14. Rocker arms |

METHODS OF INSTRUCTION

This course consists of three 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 related problems, and hands on experience with live repair projects.