

AUTO G101: INTRODUCTION TO AUTOMOTIVE TECHNOLOGY

Item	Value
Curriculum Committee Approval Date	11/03/2020
Top Code	094800 - Automotive Technology
Units	3 Total Units
Hours	72 Total Hours (Lecture Hours 45; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Local General Education (GE)	• GWC Lifelong Understanding (GE)

Course Description

This course covers the operation and maintenance of the major systems of modern automobiles. There is an emphasis on the theory of the major operating systems, including engine, electrical, chassis, and driveline systems. Transfer Credit: CSU. C-ID: AUTO 110X. C-ID: AUTO 110X.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. Analyze automotive systems and related components for correct operation.
3. Demonstrate basic automotive maintenance procedures.
4. Demonstrate industry recognized vehicle lifting procedures.
5. Perform vehicle multipoint safety inspections.

Course Objectives

- 1. Demonstrate shop safety regarding working procedures and hazardous materials and waste handling.
- 2. Identify correct procedures and specifications for maintenance and repair of vehicles using electronic service information publications.
- 3. Perform basic service and maintenance procedures using industry accepted procedures.

Lecture Content

Safety Instruction and SP-2 Mechanical Safety and Mechanical Pollution Prevention Test Introduction to the automobile Safety in the Auto Lab Major automotive components Frame and platform designs Five engine systems Powertrain arrangements Hybrid Electric Vehicles (HEV) Engine Engine components Engine block and related internal parts and components Cylinder heads and related components Operating fundamentals Science of moving air through the engine 4-stroke cycle Math associated with engine size, horsepower, and compression. Engine

systems Air intake and fuel systems Science of fuels and internal combustion Air intake: Process and systems Mixing fuel with incoming air The science of air / fuel ratio and stoichiometric Oil and the lubrication system Science of mining and processing petroleum into lubricants Concepts of friction and need for lubrication Lubricant types and correct application to different vehicle systems Filtration systems The cooling system and the science of heat exchange Water circulation and air flow Radiators and heater cores The chemistry of coolants The exhaust system Process of removing exhaust gases from the engine Parts of the exhaust system Electrical systems Fundamentals and science of electricity and electronics Electrical flow The math of Ohms law The science of magnetic induction Vehicle batteries Chemical concepts Jump-starting and auxiliary charging processes i >The starting and charging systems Electricity and magnetic induction Electro-mechanical concepts Ignition system Magnetic induction Ignition timing and the power stroke Chassis and Steering Suspension designs and operation Independent suspension McPherson strut Short / long arm suspension and geometry Alignment and steering Steering geometry Steering gears and linkages Brakes Hydraulic systems operation Tires and wheels Tires Classifications Science of traction and tire design Theory of tire balance Tire tread depth measurement Tire Pressure Monitoring System (TPMS) concepts Wheels: Factory vs. aftermarket wheels Powertrain Front- and rear-wheel drive Universal joints Constant velocity joints Four-wheel drive systems Automotive Transmissions Basic concepts, theory of power flow, and gear ratios Manual transmissions Continuously Variable Transmissions (CVT) Automatic transmissions Heating, ventilation and air conditioning Theory of refrigeratin and the science of heat exchange Heating system and refrigeration system components Air conditioning system refrigerant types: R12 vs. R-134 i

Lab Content

A. Automobile basics 1. Complete a Repair Order. 2. Use Mitchell on-line to retrieve service information. 3. Perform a vehicle visibility inspection. 4. Replace wiper blades. 5. Perform an on-ground vehicle safety check. B. Engine and related systems. 1. Check Engine Oil Level. 2. Perform an oil change. 3. Change an oil filter. 4. Check and correct coolant level. 5. Identify and inspect accessory drive belts. 6. Perform an exhaust system inspection. 7. Perform a cooling inspection. 8. Pressure test a radiator cap. 9. Replace an accessory v-belt. 10. Replace an alternator V-belt/ 11. Replace a non-serpentine v-belt. 12. Replace a serpentine drive belt. C. Electrical systems. 1. Remove and replace a headlight. 2. Remove and replace a tail lamp bulb. D. Chassis and steering. 1. Raise and support a vehicle using jack stands. 2. Raise vehicle using frame lift. 3. Check brake master cylinder fluid level. 4. Check clutch master cylinder fluid level. 5. Check power steering fluid level. 6. Inspe ct shock absorbers. 7. Perform a tire inspection. 8. Adjust tire pressure. 9. Perform a vehicle tire rotation. 10. Perform a vehicle tire wear inspection. 11. Use a tire machine to remove and replace a tire. 12. Perform a tire balance. 13. Perform a tire identification. 14. Repair a tire puncture. E. Powertrain. 1. Check automatic transmission fluid level. 2. Inspect suspension and steering linkage. 3. Check fluid level in manual transmission. 4. Check fluid in final drive (differential). F. Heating ventilation air conditioning. 1. Perform an air conditioning performance check.

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)

- DE Live Online Lab (04S)
- DE Online Lab (04X)

Reading Assignments

Text reading assignments will be assigned regularly.

Writing Assignments

Create vehicle repair orders, perform math exercises for flat rate labor, parts, and materials totals. Prepare for written and practicum exams through on-line research, outside reading assignments, lab activities. Use on-line service and repair information to compare factory specifications with actual readings and measurements acquired during diagnostic activities. Use on-line and owners manual sources to determine maintenance intervals, correct replacement fluids and levels.

Out-of-class Assignments

Students may be asked to complete various assignments in the library, on the Internet and on a vehicle.

Demonstration of Critical Thinking

Identify vehicle safety issues. Analyze, confirm, and diagnose mechanical and other issues based on symptoms indicated on repair orders. Relate diagnostic test results directly to component failures based on readings or measurements.

Required Writing, Problem Solving, Skills Demonstration

Create vehicle repair orders, perform math exercises for flat rate labor, parts, and materials totals. Prepare for written and practicum exams through on-line research, outside reading assignments, lab activities. Use on-line service and repair information to compare factory specifications with actual readings and measurements acquired during diagnostic activities. Use on-line and owners manual sources to determine maintenance intervals, correct replacement fluids and levels.

Eligible Disciplines

Automotive technology: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required James D. Halderman. Automotive Technology: Principals, Diagnosis, and Service, 6th ed. Pearson, 2020

Other Resources

1. 1. GWC Auto Tech Uniform Shirt