

J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: AUT 152 **Credits:** 5

Course Title: Automotive Engine Diagnostics

Course Description:

Introduces basic and advanced internal combustion engine concepts, including theory and practical application. Covers cooling systems, lubrication, valve train, block assembly, and general engine diagnosis. Provides preparation for the Automotive Service Excellence (ASE) A1 Engine Repair Certification examination. Lecture 2 hours. Laboratory 6 hours. Total 8 hours per week. 5 credits

General Course Purpose:

This course provides instruction on the testing, repair, and replacement of automotive engines. Focus will be on proper diagnosis including precision measuring, repair, and replacement techniques.

Course Prerequisites and Co-requisites:

Prerequisites: AUT 149 and AUT 197

Student Learning Outcomes:

Upon completing the course, the student will be able to

- Perform precision measurements on engine components
- Analyze condition of engine mechanical components
- Diagnose engine mechanical failures such as noise, consumption, and drivability
- Demonstrate proper engine removal, installation, and startup/break-in procedures
- Diagnose and repair cylinder head related concerns
- Diagnose and repair cylinder block related concerns
- Describe, test, and analyze engine cooling and lubrication systems

Major Topics to Be Included:

- Internal Combustion Engine, Construction, Function, Service and Repair
- Engine Mechanical Condition and Diagnosis
 - Compression testing
 - Cylinder leak down testing
 - Noise diagnosis
 - Exhaust diagnosis
 - Oil and coolant consumption diagnosis
- Engine Removal and Installation Techniques
- Valve Train Construction, Service, Repair and Diagnosis
 - Engine timing repairs (belt and chain)
 - Variable valve timing operation and diagnosis
 - Cylinder head, valve guide, valve and valve seat diagnosis and repair
- Cylinder Block and Lower End Construction, Function, Service and Repair
 - Pistons, rings, and connecting rods

- Cylinder block measurements and analysis
- Cylinder servicing
- Crankshaft, balance shaft, and bearings
- Cleaning and reassembly
- Lubrication and Cooling System Service, Diagnosis and Repair.
 - Oil pressure and oil pump measurements
 - Cooling system operation and diagnosis

Effective Date/Updated: January 19, 2023