

CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

AUTOMOTIVE TECHNOLOGY 120 – ENGINE PERFORMANCE I – MECHANICAL AND IGNITION SYSTEMS

3 hours lecture, 6 hours laboratory, 5 units

Catalog Description

First in a three course series dealing with engine performance. Begins with a review of basic engine mechanical systems and an introduction to vehicle emissions and computer scanners, followed by a detailed study of current ignition systems. Students will be required to complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Initial preparation for ASE Engine Performance (A-8) Certification.

Prerequisite

None

Course Objectives

Students will be able to:

- 1) Acquire safe working habits
- 2) Relate the theory of engine systems for practical application
- 3) Independently demonstrate ability to perform engine mechanical and ignition system diagnosis and repair to industry standards

Special Materials Required of Student

- 1) Basic hand tool set
- 2) Safety glasses
- 3) Notebooks, required textbook

Minimum Instructional Facilities

- 1) Automotive technology lab
- 2) Complete tune-up and diagnostic equipment center
- 3) SMART classroom with projection screen
- 4) Various automotive training models
- 5) Demonstration classroom with vehicle access
- 6) Automotive transparencies, PowerPoint presentations, CD/DVD videos

Course Content

- 1) Lecture:
 - a. Introduction and safety
 - b. Engine fundamentals
 - c. Engine measurements
 - d. General engine diagnosis
 - e. Introduction to basic electrical principles
 - f. Introduction to use of Digital Volt Ohm Meter (DVOM)
 - g. Introduction to battery, starter and alternator testing
 - h. Automotive wiring diagrams as associated with ignition and related systems
 - i. Ignition system, operation and diagnosis including distributor, distributorless ignition and Coil on Plug systems
 - j. Cooling system operation, testing and service
 - k. Ignition tune-up maintenance procedures
 - l. Oscilloscope function and operation
 - m. Introduction to infrared emission analyzer
 - n. Computerized ignition timing controls
- 2) Lab:
 - a. Hand tool selection and usage
 - b. General engine diagnosis

- c. Introduction to use of Digital Volt Ohm Meter (DVOM)
- d. Basic battery, starter and alternator testing
- e. Cooling system diagnosis and repair
- f. Ignition system troubleshooting and repair including distributor, distributorless ignition and Coil on Plug systems
- g. Maintenance tune-up procedures
- h. Valve adjustment
- i. Electronic service information access
- j. Diagnostic equipment usage
- k. Introduction to scan tool usage

Method of Instruction

- 1) Lecture and demonstration
- 2) Individual assistance
- 3) Small group discussions

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes and written exams
- 2) Observation of shop work
- 3) Inspection of work completed

Texts and References

- 1) Required: Halderman, Automotive Engine Performance. Prentice Hall, 2003.
- 2) Supplemental: None

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Familiar with basic electrical laws of physics including Ohms law
- 2) Understand causes and types of automotive emissions
- 3) Understand theory and basic repair practices of the inductive discharge ignition system
- 4) Ability to perform basic mechanical engine diagnostic tests including:
 - a. Compression test
 - b. Cylinder leakage test
 - c. Vacuum gauge analysis tests
 - d. Cylinder power balance tests
- 5) Ability to diagnose ignition system utilizing an automotive ignition oscilloscope (scope)
- 6) Familiar with basic use of Digital Volt Ohm Meter (DVOM)
- 7) Basic understanding of scan tool operation.
- 8) Understanding of basic engine operating principles