

## CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

### **AUTOMOTIVE TECHNOLOGY 124 – ENGINE PERFORMANCE III – DRIVABILITY**

3 hours lecture, 6 hours laboratory, 5 units

#### **Catalog Description**

The capstone course in a three course engine performance series. Students will utilize skills developed in the first two courses to perform drivability diagnostics on all related engine systems. Emphasis on advanced application of scan tools and digital storage oscilloscopes (DSO) in the diagnosis of hard to find system problems, especially intermittent concerns. Students will be required to complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Preparation for ASE Advanced Engine Performance (L-1) Certification.

#### **Recommended Preparation**

AUTO 123

#### **Entrance Skills**

Without the following skills, competencies and/or knowledge, and student entering this course will be highly unlikely to succeed:

- 1) Basic understanding of electronics and solid state electronics
- 2) Basic understanding of microprocessors, computers and logic systems
- 3) Understanding of computer input and output devices
- 4) Understand the operation of computer control of carburetor and fuel injection systems
- 5) Understanding of turbochargers and superchargers
- 6) Ability to diagnose basic computer-related malfunctions
- 7) Ability to diagnose computer input and output systems with scan tool, digital storage oscilloscope (DSO) and Digital Volt Ohm Meter (DVOM)
- 8) Ability to service and troubleshoot fuel injection systems

#### **Course Objectives**

Students will be able to:

- 1) Distinguish between safe and unsafe work habits
- 2) Analyze actual vehicle computer control systems and apply theory of system operation to diagnostic procedures
- 3) Independently demonstrate the ability to analyze and repair vehicle systems and perform repairs using available diagnostic equipment
- 4) Evaluate technical service bulletins for assisting in repairing various drivability concerns

#### **Special Materials Required of Student**

- 1) Basic hand tool set
- 2) Approved safety glasses
- 3) 10 MEG OHM impedance digital VOM
- 4) Notebook, required textbook

#### **Minimum Instructional Facilities**

- 1) Auto tech lab (6 bays)
- 2) Complete tune-up and diagnostic center
- 3) Specialized computer and fuel injection test equipment
- 4) Various computer and FI equipped vehicles and test stands
- 5) Automotive videotapes, PowerPoint presentations, training CDs/DVDs
- 6) VCR/monitor
- 7) SMART classroom

**Course Content**

- 1) Lecture:
  - a. Introduction and safety
  - b. Mapping various input sensors data
  - c. Advanced system diagnosis utilizing digital storage oscilloscope (DSO)
  - d. Diagnosing computer-related malfunctions
  - e. Circuit waveform analysis
  - f. Diagnosing fuel injection systems when no trouble codes are present
- 2) Lab:
  - a. Introduction and safety
  - b. Oscilloscope experimentation
  - c. Mapping various input sensors data
  - d. Perform advanced system diagnosis with digital storage oscilloscope (DSO)
  - e. Diagnosing computer-related malfunctions
  - f. Acquiring circuit waveforms for analysis of drivability concerns
  - g. Servicing fuel injection systems
  - h. Accessing technical service bulletins (TSBs) and electronic service information

**Method of Instruction**

- 1) Demonstration
- 2) Individual assistance

**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 student work
- 3) Inspection of work completed
- 4) Hands-on performance exam

**Texts and References**

- 1) Required: Halderman, Advanced Engine Performance Diagnosis. Prentice Hall, 1998.
- 2) Supplemental: Various vehicle repair manuals, electronic information systems and technical service bulletins as supplied through the Automotive Department reference library