A. TITLE: Engine Performance II

B. COURSE NUMBER: AUTO 213

C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

# Credit Hours: 4
# Lecture Hours _3_ per Week
# Lab Hours _3_ Week
Other ____ per Week

Course Length (# of Weeks): 15

D. WRITING INTENSIVE COURSE: NO

E. GER CATEGORY: NONE

F. SEMESTER(S) OFFERED: FALL

G. COURSE DESCRIPTION:
   This course begins where Engine Performance I terminates. Sophisticated OBD II engine control systems are studied which include Variable Valve Timing and Lift, Boost, and Emissions Controls. The student learns and applies knowledge of the integration of the above systems and powertrain/engine control computer (PCM). Diagnosis and repair include test equipment such as digital volt-ohm meters, oscilloscopes, and interactive computer scanners. Students continually utilize the latest automotive reference materials in diagnosis and repair procedures.

H. PRE-REQUISITES: AUTO 112, AUTO 122, AUTO 113, and AUTO 114
   CO-REQUISITES: NONE

I. STUDENT LEARNING OUTCOMES:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>PSLO</th>
<th>ISLO</th>
<th>Subsets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the operation of OBD II light duty diagnostic systems.</td>
<td>ALO1, ALO2</td>
<td>2-Crit Thinking 5-Ind, Prof, Disc, Know Skills</td>
<td>CA, IA, PS</td>
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<tr>
<td>Describe how OBD II trouble codes are set, stored, and cleared.</td>
<td>ALO1, ALO2</td>
<td>2-Crit Thinking 5-Ind, Prof, Disc, Know Skills</td>
<td>CA, IA, PS</td>
</tr>
<tr>
<td>Describe the different OBD II operation modes.</td>
<td>ALO1, ALO2</td>
<td>2-Crit Thinking 5-Ind, Prof, Disc, Know Skills</td>
<td>CA, IA, PS</td>
</tr>
<tr>
<td>Access and utilize OBD II data including generic and global data.</td>
<td>ALO1, ALO2</td>
<td>2-Crit Thinking 5-Ind, Prof, Disc, Know Skills</td>
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</table>
| Access, utilize, and clear OBD II trouble codes. | ALO1, ALO2 | 2-Crit Thinking 5-Ind, Prof, Disc, Know Skills | CA, IA, PS  
| Retrieve and interpret scanner data | ALO1, ALO2 | 2-Crit Thinking 5-Ind, Prof, Disc, Know Skills | CA, IA, PS  
| Interpret trouble code diagnostic charts. | ALO1, ALO2 | 2-Crit Thinking 5-Ind, Prof, Disc, Know Skills | CA, IA, PS  
| Interpret and diagnose the entire emissions system on computer-controlled vehicles. | ALO1, ALO2 | 2-Crit Thinking 5-Ind, Prof, Disc, Know Skills | CA, IA, PS  

### KEY

**Institutional Student Learning Outcomes**

**ISLO 1 – 5**

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>ISLO &amp; Subsets</th>
</tr>
</thead>
</table>
| 1 | Communication Skills  
Oral [O], Written [W] |
| 2 | Critical Thinking  
Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS] |
| 3 | Foundational Skills  
Information Management [IM], Quantitative Lit./Reasoning [QTR] |
| 4 | Social Responsibility  
Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T] |
| 5 | Industry, Professional, Discipline Specific Knowledge and Skills |

**J. APPLIED LEARNING COMPONENT:** Yes ___ No _______

If Yes, select one or more of the following categories:

- Classroom/Lab  
- Internship ______
- Clinical Practicum______
- Practicum____
- Service Learning____
- Community Service____
- Civic Engagement____
- Creative Works/Senior Project____
- Research____
- Entrepreneurship____
- (program, class, project)

**L.** REFERENCES: ShopKey Pro

**M.** EQUIPMENT: Snap-On scanners and student tool list

**N.** GRADING METHOD: A-F

**O.** SUGGESTED MEASUREMENT CRITERIA/METHODS: Exams, quizzes, homework, lab practical, and lab performance

**P.** DETAILED COURSE OUTLINE:
   1. Review of Engine Performance I
   2. No-Start Diagnosis
   3. On-Board Diagnostics
      a. History
      b. OBD II Standards
      c. The 10 Modes of OBD II
   4. Emission Control
      a. History
      b. Components
      c. Diagnostics
   5. PCM Diagnostics
      a. Inputs
      b. Outputs
      c. Scanner usage
      d. Digital Storage Scope
      e. Freeze Frame
   6. Precision Fuel Control
      a. Short Term Fuel Trim
      b. Long Term Fuel Trim
   7. Variable Valve Timing and Lift Control
   8. Boost and boost controls

**Q.** LABORATORY OUTLINE: Same as course outline