A. **TITLE:** AUTO 213 ENGINE PERFORMANCE II

B. **COURSE NUMBER:** AUTO 213

C. **CREDIT HOURS:** 4

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 WEEKS

F. **SEMESTER(S) OFFERED:** FALL ONLY

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:** 3 lecture hours per week, 3 laboratory hours per week

H. **CATALOGUE DESCRIPTION:** This course begins where Engine Performance I terminates. Sophisticated engine control systems are studied which include distributorless ignition, electronic spark control and emission control. The student learns and applies knowledge of the integration of the above systems and powertrain/engine control computer (PCM). Diagnosis and repair includes 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.

I. **PRE-REQUISITES/CO-REQUISITES:**
   a. Pre-requisite(s): Auto 112, AUTO 122, AUTO 113, AUTO 114
   b. Co-requisite(s): NONE

J. **GOALS (STUDENT LEARNING OUTCOMES):**

<table>
<thead>
<tr>
<th>Course Objectives</th>
<th>Institutional SLO</th>
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<tr>
<td>Determine test spark output</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<tr>
<td>Diagnose no spark/no start conditions</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<td>Interpret scope patterns</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<td>Describe the operation of OBD II light duty diagnostic systems</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<td>Describe how OBD II trouble codes are set, stored, and cleared</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<td>Describe the different OBD II operation modes</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<td>Access and utilize OBD II data including generic and global data</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<tr>
<td>Access, utilize, and clear OBD II trouble codes</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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<tr>
<td>Retrieve diagnostic trouble codes with a diagnostic scanner</td>
<td>2. Crit Thinking 3. Prof. Competence</td>
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Retrieve and interpret scanner data
Interpret trouble code diagnostic charts
Diagnose catalytic converters
Diagnose and repair EGR systems
Diagnose and repair evaporative emission systems
Interpret and diagnose the entire emissions system on computer controlled vehicles.


L. **REFERENCES:** Manufacturer Service Manuals, Alldata, ShopKey

M. **EQUIPMENT:** Snap-on scanners, Tech II, DRB III, Star Tester, SUN 450, spark testers

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

O. **MEASUREMENT CRITERIA/METHODS:** quizzes, tests, lab performance

P. **DETAILED TOPICAL OUTLINE:**

1. Review of Engine Performance I
2. Electronic Spark control/Timing
   a. Timing requirements
   b. by-pass systems
   c. Up-integrated systems
   d. Inputs
3. Distributorless Ignition Systems (DIS)
   a. Theory of Operation
   b. Diagnostics
   c. Inputs
4. On-Board Diagnostics
   a. History
   b. OBD II
5. Emission Control
   a. History
   b. Components
   c. Diagnostics
6. PCM Diagnostics
   a. Inputs
   b. Outputs
   c. Scanner usage
   d. Digital Storage Scope
   e. Freeze Frame
7. Precision Fuel Control
   a. Short Term Fuel Trim
   b. Long Term Fuel Trim
   c. Trim Cells

R. **LABORATORY OUTLINE**: same as detailed outline