A. **TITLE**: AUTO 214 AUTOMOTIVE COMPUTER SYSTEMS

B. **COURSE NUMBER**: AUTO 214

C. **CREDIT HOURS**: 3

D. **WRITING INTENSIVE COURSE**: No

E. **COURSE LENGTH**: 15 WEEKS

F. **SEMESTER(S) OFFERED**: SPRING

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

H. **CATALOGUE DESCRIPTION**: Review of electrical and electronic devices used in automobiles. Study of on-board diagnostic systems for both domestic and import vehicles. Diagnosis of computerized automotive systems.

I. **PRE-REQUISITES/CO-REQUISITES**: 
   a. Pre-requisite(s): AUTO 212, AUTO 213, AUTO 220 
   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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<tbody>
<tr>
<td>Design circuits using electronics.</td>
<td>2. Crit Thinking</td>
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<td></td>
<td>3. Prof. Comp</td>
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<tr>
<td>Describe the basic operation of an automotive computer</td>
<td>3. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<tr>
<td>Describe computer types and locations</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<td>Access and interpret vehicle computer information using a scan tool</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<tr>
<td>Access and interpret vehicle computer information using a lab scope</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<td>Perform diagnostics using scan tools and lab scopes</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<td>Develop a systematic diagnostic process</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<td>Perform all of the above within the safety guidelines in Auto 101, 111 and reviewed at the beginning of this course.</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<tr>
<td>Pass the Snap-On Diagnostic Exams.</td>
<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<td>Construct a report of waveforms and be able to discuss the results.</td>
<td>1. Comm skills</td>
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<td>2. Crit Thinking</td>
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<td>3. Prof. Comp</td>
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<td>Pass the NATEF End of Program Exams with 90% or better</td>
<td>2. Crit Thinking</td>
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<tr>
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<td>3. Prof. Comp</td>
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L. **REFERENCES:** Manufacturer Service manuals, Alldata, Snap-On Verus.

M. **EQUIPMENT:** Classroom with overhead projector, scan tools, lab scopes, low amperage clamps

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

O. **MEASUREMENT CRITERIA/METHODS:** exams, quizzes, homework, lab performance, Snap-On exams success results in additional certificates

P. **DETAILED TOPICAL OUTLINE:**

1. **Introduction**
   1. Tools
   2. Safety

2. **ABS, Traction Control, and Electronic Stability Control Systems**
   1. Analyze and interpret wheel speed sensor data
   2. Analyze and interpret EBCM data and operation principles

3. **Supplemental Inflatable Restraint Systems**
   1. Theory and operation
   2. Handling

4. **Motor analysis and interpretation used for diagnosis**
   1. fuel pumps
   2. ABS pumps
   3. window motors

5. **Solenoid analysis and interpretation use for diagnosis**
   1. starter
   2. fuel injectors
   3. EGR

6. **Computer communication progression**
   1. ODB I
   2. OBD II
   3. CAN/BUS
   4. 10 modes of OBD II in CAN

7. **Snap-On Diagnostics Training using the Snap-On Verus**
   1. Navigation
   2. Electrification and Measurement

8. **Hybrids**
   1. Introduction
   2. Safety
   3. Regenerative Braking
   4. Fuel Cells

Q. **LABORATORY OUTLINE:**

1. Introduction
1. Tools
2. Safety

II. Review scan tool operations
   1. Data retrieval and interpretation
   2. Reading diagnostic trouble codes
   3. Using diagnostic trouble codes to diagnose concerns with diagnostic charts
   4. Repair concern associated with diagnostic trouble codes
   5. Diagnosis using snapshot and freeze frame functions

III. Lab scope operations
   1. Actuator data retrieval and interpretation
   2. Diagnosis using live signal viewing and waveforms
   3. Use low amperage clamps to retrieve waveforms

IV. Scan tool diagnostics using CAN/BUS
   1. Observe and practice methods used with scan tools and DVOM that now can be done with one tool.
   2. Observe and practice computer network communications

V. Use the 10 Modes of OBD II to diagnose Engine Performance issues.

VI. Hybrids
   1. Safety
   2. Scan Tool usage for diagnosis