STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
AUTO 214 – AUTOMOTIVE COMPUTER SYSTEMS

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Canino School of Engineering Technology

Department: AUTOMOTIVE TECHNOLOGY

Semester/Year: SPRING 2018

A. **TITLE**: Automotive Computer Systems

B. **COURSE NUMBER:** AUTO 214

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

 # Credit Hours: 3
 # Lecture Hours: 3 **per week**
 # Lab Hours: 2 **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☒ No ☐

E. **GER CATEGORY: None:** ☒ **Yes:** GER !
***If course satisfies more than one*:** GER !

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☒ **Fall & Spring** ☐

G. **COURSE 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. A writing intensive course.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

AUTO 101, AUTO 111, AUTO 112, AUTO 122, AUTO 213

CO-REQUISITES: None ☐ **Yes** ☒ **If yes, list below:**

AUTO 212

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
Describe the basic operation of an automotive computer.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Describe computer types and locations.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Access and interpret vehicle computer information using a scan tool.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Access and interpret vehicle computer information using a lab scope.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Perform diagnostics using scan tools and lab scopes.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Develop a systematic diagnostic process, the 8 step diagnostic process.	ALO1,ALO3		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets

Perform all of the above within the safety guidelines in Auto 101, 111 and reviewed at the beginning of this course.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Pass the Snap-On Diagnostic Exams.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets
Construct a report of waveforms and be able to discuss the results.			1-Comm Skills 2-Crit Think 5-Ind, Prof, Disc, Know Skills	W CA IA PS
Pass the NATEF End of Program Exams with 90% or better.	ALO1		2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO	CA IA PS Subsets

KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
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**

*Include program objectives if applicable. Please consult with Program Coordinator !

J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

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

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service
- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☒ Entrepreneurship (program, class, project)

K. TEXTS:

Diagnosis and Trouble Shooting of Automotive Electrical, Electronic, and Computer Systems by James Halderman. Electrical and Electronic Systems, NATEF Standards Job Sheets, current edition. by Jack Erjavec

L. REFERENCES:

ShopKeyPro, AllData, Subaru STIS, Snap-On scan tools

M. EQUIPMENT: None ☐ **Needed:** Snap-On Scanners, student tool list, low amp clamps

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

exams, quizzes, homework, lab performance, Snap-On exams success results in additional certificates, report

P. DETAILED COURSE OUTLINE:

I. Introduction
- **1. Tools**
- **2. Safety**

II. ABS, Traction Control, and Electronic Stablility Control systems
- **1. Analyze and interpret wheel speed sensor data**
- **2. Analyze and interpret EBCM data and operation principles**

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

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

V. Solenoid analysis and interpretation use for diagnosis

1. starter
2. fuel injectors
3. EGR

VI. Computer communication progression

1. ODB I
2. OBD II
3. CAN/BUS
4. 10 modes of OBD II in CAN

VII. Snap-On Diagnostics Training using the Snap-On Verus

1. Navagation
2. Electrification and Measurement

VIII. Hybrids

1. Introduction
2. Safety
3. Regenerative Braking
4. Fuel Cells

Q. <u>LABORATORY OUTLINE</u>: None ☒ Yes ☐

I. 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
6. Use of the 8 step diagnostic process.

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