# SOUTHEAST COMMUNITY COLLEGE
# TRANSPORTATION OCCUPATIONS
# AUTOMOTIVE SERVICE EDUCATIONAL PROGRAM (ASEP)
# COURSE SYLLABUS
# December 14, 2022

## I. CATALOG DESCRIPTION

Course Number: ASEP2410
Course Title: GM Advanced Control Systems
Prerequisite: ASEP1111, ASEP1116

Catalog Description: This course covers advanced level study of theory, operating principles, diagnosis, service and repair of GM Hybrid/EV and GM powertrain electronic and emission control systems. As well as advanced level study of theory, operating principles, diagnosis, service and repair of GM electrical systems, network communication, and ADAS systems.

Credit Hours: 6.0
Class Hours: 53
Lab Hours: 113
Total Contact Hours: 166

## II. COURSE OBJECTIVES: *Course will:*

- **A.** Introduce and identify advanced level aspects of GM powertrain electronic control systems.
- **B.** Discuss theory and testing of GM Spark Ignition Direct Injection (SIDI) systems.
- **C.** Discuss theory and testing of throttle actuator control systems.
- **D.** Discuss theory of emission control testing and certification procedures.
- **E.** Discuss theory of 5 gas exhaust testing equipment and procedures.
- **F.** Discuss theory, operation, and diagnosis of GM vehicle emission control systems.
- **G.** Discuss safety procedures required when working with high voltage electrified vehicles.
- **H.** Discuss theory, operation, diagnosis, and repair of General Motors electric and electrified vehicles.
- **I.** Discuss theory, operation, diagnosis, and repair of emission control devices.
- **J.** Discuss theory, operation, diagnosis, and repair of engine performance concerns.
- **K.** Introduce and identify advanced level aspects of GM electrical and electronic systems.
- **L.** Discuss theory, operation, diagnosis, and repair of computer and network systems.
- **M.** Discuss theory and testing of driver information and navigation systems.
- **N.** Discuss theory, operation, diagnosis, and repair of safety belts and airbags.
- **O.** Discuss theory, operation, diagnosis, and repair of audio systems.
- **P.** Introduce and identify types of General Motors heating, ventilation and air conditioning systems.
- **Q.** Discuss theory, operation, diagnosis and repair of General Motors heating, ventilation and air conditioning systems.

## III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

**A. STUDENT LEARNING OUTCOMES:** *Student will be able to:*

1. Perform lab exercises in a safe and workmanlike manner according to General Motor Service Information procedures.
2. Recall theory of powertrain electronic systems.
3. Recall properties and applications of GM Spark Ignition Direct Injection (SIDI) systems.
4. Perform GM Spark Ignition Direct Injection (SIDI) system diagnostic and repair procedures according to General Motors service procedures.
5. Recall properties and applications of throttle actuator control systems.
6. Perform vehicle emission control system diagnostic and repair procedures according to General Motors service procedures.
7. Perform advanced powertrain electronic control system diagnostic and repair procedures according to General Motors service procedures.
8. Recall properties and applications of GM electric drive and electrified powertrain vehicles.
9. Perform electrified powertrain system diagnostic and repair procedures according to General Motors service procedures.
10. Recall theory of electrical and electronic circuits and systems.
11. Recall properties and applications of infotainment systems.
12. Perform infotainment system diagnostic and repair procedures according to General Motors service procedures.
13. Recall properties and applications of body control system accessory circuits.
14. Perform body control system diagnostic and repair procedures according to General Motors service procedures.
15. Recall properties and applications of safety belt and inflatable restraint systems.
16. Perform safety belt and inflatable restraint system diagnostic and repair procedures according to General Motors service procedures.
17. Perform electrified powertrain system diagnostic and repair procedures according to General Motors service procedures.
18. Recall theory of operation and diagnostic principles for Anti-Lock Brake and Traction Control Systems.
19. Analyze and diagnose GM ABS/TCS systems using GDS2 and GM Service Information.
20. Recall ABS/TCS component replacement procedures using GM Service Information.

**B. GENERAL EDUCATION LEARNING OUTCOMES:**

**GELO #3: Critical Thinking and Problem Solving**

**Outcome:**

1. Collect, identify interpret and analyze data.

## IV. CONTENT/UNIT OF INSTRUCTION

**A.** Gasoline direct-injection systems
**B.** Throttle actuator control systems
**C.** Vehicle emission standards and testing
**D.** Emission control devices operation and diagnosis
**E.** Engine performance diagnosis
**F.** Computer and network fundamentals
**G.** General Motors hybrid/EV vehicles
**H.** Driver information and navigation systems

**I.** Accessory circuits
**J.** Safety belts and airbags
**K.** Audio system operation and diagnosis
**L.** GM ABS and TCS systems

## V. INSTRUCTIONAL MATERIALS

The Course Information Document lists the current text(s) required for this class. The list is also available in the campus bookstore. The Course Information Document also lists the tools/equipment or other supplies required for this class.

## VI. METHODS OF PRESENTATION/INSTRUCTION

**A. Methods of presentation typically include a combination of the following:**

1. Lecture
2. Small and large group discussion
3. Video presentation
4. Demonstrations
5. Project boards
6. Handouts
7. Observations
8. Assigned lab projects
9. Online information
10. Field trips

## VII. METHODS OF EVALUATION

**A. Methods of evaluation typically include a combination of the following:**

1. Notebook (if required)
2. Quizzes
3. Tests
4. Lab grades
5. Attendance/class conduct

Letter grades will be based on the SCC Standard Grade Scale Policy. **Note:** See Course Information Document for specific details on how the course grades will be calculated.

## VIII. SPECIFIC COURSE REQUIREMENTS

**A. Student must:**

1. Complete all tests, projects, assignments, and notebook (if required).
2. Earn a final grade of 70% (2.0) or higher.

**B. Attendance:**

1. Students must follow the Attendance Policy as stated in the college student handbook, automotive lab and classroom policies handbook or Course Information Document.

**C. Shop safety rules will be followed.**

**D. Any additional course requirements as stipulated by the Instructor.**