



## ADVANCED ENGINE PERFORMANCE — AUTM 2344

### A. Course Description

- **Credits:** 5.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 4.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course will focus on emission control systems and hybrid vehicle operation, diagnosis, and repair. Live work will be at the core of this course and will reinforce understandings obtained in prior courses. Prerequisite: Successful completion of AUTM1003, AUTM 1013, AUTM2314, AUTM2324, and AUTM2334 with a minimum overall score of 70% OR concurrent enrollment in course 2960 Skill Development with instructor approval.

### B. Course Effective Dates: 8/21/17 – Present

### C. Outline of Major Content Areas

As noted on course syllabus

### D. Learning Outcomes

1. 1. Complete work order to include customer information vehicle identifying information, customer concern, related service history, cause, and correction
2. 10. Diagnose emissions and drivability concerns caused by the secondary air injection and catalytic converter systems; determine necessary action.
3. 11. Diagnose emissions and drivability concerns caused by the evaporative emissions control system; determine necessary action.
4. 12. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.
5. 13. Inspect, test, service, and replace components of the EGR system including tubing, exhaust passages, vacuum/pressure controls, filters, and hoses; perform necessary action
6. 14. Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.
7. 15. Inspect and test catalytic converter efficiency.

8. 16. Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.
9. 17. Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.
10. 18. Test the operation of turbocharger/supercharger systems; determine necessary action.
11. 19. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed.
12. 2. Identify and demonstrate industry recognized professionalism and safety procedures
13. 20. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.
14. 21. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions
15. 22. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.
16. 23. Identify hybrid vehicle A/C system electrical circuits and service/safety precautions
17. 24. Identify hybrid vehicle power steering system electrical circuits and safety precautions.
18. 25. Identify hybrid vehicle internal combustion engine service precautions
19. 26. Describe the operational characteristics of a hybrid vehicle drive train.
20. 27. Demonstrate awareness of the safety aspects of hybrid vehicle high voltage circuits.
21. 3. Identify and demonstrate proper use of various automotive tools and equipment
22. 4. Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins
23. 5. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems
24. 6. Diagnose electrical/electronic integrity for series, parallel, and series parallel circuits using principles of electricity (Ohm's Law)
25. 7. Diagnose oil leaks, emissions, and drivability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.
26. 8. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.
27. 9. Diagnose emissions and drivability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.

#### **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

#### **F. Learner Outcomes Assessment**

As noted on course syllabus

**G. Special Information**

None noted