

**HIBBING COMMUNITY COLLEGE  
COURSE OUTLINE**

**COURSE TITLE & NUMBER:** Advanced Engine Performance: ASES 2026  
**CREDITS:** 4 (34 Lec / 68 Lab)  
**PREREQUISITES:** Instructor approval.

**CATALOG DESCRIPTION:**

Advanced Engine Performance course expands upon the knowledge learned in ASES 2027(Auto Computers). OBDII (On Board Diagnostic 2nd generation) operation and program logic will be covered. Diagnosis and repair of drivability problems associated with OBD II systems will be taught in this course. Practical exercises on school vehicles reinforce learned knowledge with hands-on experience.

**OUTLINE OF MAJOR CONTENT AREAS:**

- I. Safety precautions
- II. Digital Scope advanced usage
- III. Basic engine performance review
  - A. Controller inputs
  - B. Controller outputs
  - C. Basic system operation and strategy
- IV. OBDII operational logic
- V. OBDII hardware differences
- VI. System monitors operation
- VII. Scan-Tool usage on OBDII systems
- VIII. GM OBDII systems
- IX. Daimler Chrysler OBDII systems
- X. Ford OBDII Systems
- XI. Generic OBDII
- XII. Hybrid vehicles
- XIII. Light diesel

**COURSE GOALS/OBJECTIVES/OUTCOMES:**

Students will

1. explain OBDII.
2. explain PCM internal data processing.
3. explain feedback monitoring.
4. test digital inputs.
5. test analog inputs.
6. explain ground side driver operation.
7. explain feed side driver operation.

8. explain PWM.
9. explain H gate operation.
10. test ground side drivers.
11. test feed side drivers.
12. test H gate operation.
13. monitor PWM requests.
14. test PCM data using a scan tool.
15. perform record function on the scan tool.
16. explain short and long term fuel trim.
17. check for PCM fault codes.
18. diagnose drivability complain.
19. explain adaptive controls.
20. inspect for vacuum leaks and unmetered air.
21. verify proper idle speed.
22. monitor inputs and outputs to verify proper operation.
23. check for PCM fault codes using scan data.
24. diagnose drivability complaint using lab scope.
25. diagnose drivability complaint using DMM.
26. check electrical system for electrical noise.
27. check electrical system for AC voltage.
28. select proper test equipment for diagnosis of drivability problems.
29. diagnose a OBD I computer system.
30. diagnose a OBD II computer system.
31. check for proper engine control operation by road testing.
32. verify customer concern.
33. verify proper repair.
34. check OBDII readiness status.
35. check OBDII monitors during a road test.
36. check OBDII fault codes.
37. clear OBDII fault codes.
38. check freeze frame data.
39. explain purpose of generic OBDII protocol.
40. locate generic OBDII data on scan tool.
41. explain various mode data for generic OBDII
42. retrieve and clear DTC's using generic scan tool.
43. explain hybrid vehicle operation.
44. identify high voltage safety and proper disconnect.
45. identify hybrid engine service precautions.
46. discuss hybrid steering, brake and HVAC systems.
47. describe regenerative braking.
48. identify hybrid vehicle 12v battery service and jump start procedure.
49. discuss light diesel engine operation.
50. explain compression ignition.
51. identify diesel exhaust after treatment devices.
52. check and refill diesel exhaust fluid.

The instructor may deviate from the above list to meet industry changes and time or space availability.

**MNTC GOALS AND COMPETENCIES MET:**

N/A

**HCC COMPETENCIES MET:**

Working Productively & Cooperatively  
Communicating Clearly & Effectively  
Thinking Creatively & Critically

**STUDENT CONTRIBUTIONS:**

The student will be expected to

1. attend all class sessions.
2. participate in class activities and discussions.
3. request assistance when needed .
4. complete and hand in assigned work when due.

Attendance is critical: if the student is not present they cannot participate in or, contribute to the learning process.

**STUDENT ASSESSMENT SHALL TAKEP LACE USING INSTRUMENTS SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.**

**SPECIAL INFORMATION: (SPECIAL FEES, DIRECTIVES ON HAZARDOUS MATERIALS, ETC.)**

Handouts and other materials will be provided in class.  
Factory and aftermarket service manuals will be used for reference.  
Safety glasses

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| <b>AASC APPROVAL DATE:</b> December 18, 2013 |
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| <b>REVIEW DATE:</b> December 2018 |
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