AUMT 2334
Engine Performance Analysis II

Course Description: This course covers the theory of operation, diagnosis and service of fuel systems. This is the second of two courses covering engine performance. The course includes mechanical and electric fuel delivery systems, ETC throttle body, direct/port fuel injection systems and ignition systems. Computerized scan tools, DVOM’s, and oscilloscopes will be used extensively as a means to diagnose engine performance problems.

Course focus: This course includes a substantial amount of hands-on learning activities, which cannot be rescheduled. Regular attendance and timely arrival are mandatory for successful completion of this course.

Attendance and Arrivals: An "Absence" consists of being either absent for the day or late to class no greater than 30 minutes after the scheduled start time. A Late arrival consists of arriving to class no greater than 29 minutes after the scheduled start time. A total of three (3) absences will result in a failing grade for the course.

Tools and Equipment: Each student is required to have access to a complete set of tools as described in the Brookhaven College Comprehensive Automotive Tool list. If during a laboratory assignment a group or individual does not access to the required tools; that group or individual will not be able to participate in any laboratory exercise. Groups are made in an attempt to optimize tool usage within that group. It is advised that no one is allowed to borrow tools from outside their group.

Cell phones and Texting: We all lead important lives where we cannot be out of touch for FIVE hours a day. But, in this program we must. We take brakes throughout the course of a day and this provides the student time to text or talk. Please refrain from texting during class (lecture/lab). The widely used stealth method of "under the table" is highly detectable by the highly trained instructors.

Laptops: Laptops are welcome in class for class related work such as note taking; web based training (not during lecture), and service information.

Laboratory: The laboratory environment is created and controlled by rules that each and every student must follow. If you do not abide by the rules you will not receive credit for any of the activities (labs, exams, quizzes, etc.) for that day. The instructor and laboratory coordinator monitors your laboratory behavior, performance, and participation. Below is a list of a few infractions that if you are observed participating in will cause you to lose credit for the day.

- In the shop without safety glasses.
- Horseplay in the shop.
- Working without service information.
- Sleeping in the shop or vehicles.
- Harassing a fellow student.
- Throwing objects in the shop.

Above is an attempt to quantify poor student behavior. It is in no way a replacement for common sense and I hope we can all exercise common sense.
Texts and References:
- Automotive Technology (principles, diagnosis, and service) Author: James D. Halderman
  Publisher: Prentice Hall
- Automotive laboratory exercises.
- Selected Manufacturer Specific Materials/Publications
- Selected internet and online resources

Course Goals:
The following is a list of goals which will be addressed in the course. These goals are directly related to the performance objectives. (Each and every goal is crucial.)

1. define fuel system components
2. explain fuel pressure regulator operation
3. explain fuel pump operation
4. explain fuel system diagnostic procedures
5. replace fuel filter
6. test fuel system pressure
7. test fuel pump/pressure regulator operation
8. interpret fuel system pressure tests
9. analyze fuel quality
10. troubleshoot electronic fuel pump circuit
11. identify basic fuel injection circuits
12. explain basic fuel injection circuits
13. explain ECM fuel control
14. explain computer controlled fuel injection operation
15. explain ECM controlled fuel system operation
16. explain ECM controlled IAC system operation
17. explain ECM controlled ignition system operation
18. explain ECM controlled emission system operation
19. explain ECM fail safe operation modes
20. explain ECM controlled MIL operation
21. explain ECM on board diagnostic procedures
22. list common ECM input sensors
23. list common ECM controlled output devices
24. explain voltage generator sensor circuit operation
25. explain voltage divider sensor circuit operation
26. explain frequency generating sensor circuit operation
27. explain ECM controlled output device
28. locate necessary service manual operation
29. apply necessary service manual information
30. measure fuel injector on-time
31. replace fuel injector
32. interpret related scan tool data
33. check ECM output signals
34. check ECM sensor input signals
35. troubleshoot ECM DTCs
36. troubleshoot ECM controlled fuel delivery systems
37. troubleshoot ECM controlled IAC systems
38. troubleshoot ECM controlled ignition systems
39. troubleshoot ECM controlled emission systems
Student Contributions:
The student will spend at least 15 hours per week preparing for class.
Attendance and timely arrival are very critical in this class.
Attention and participation is also critical in this class.

Evaluation:
Final grade is composed of:
25% = Attendance and Participation
25% = Lab Grades
25% = Quizzes and Homework
25% = Exams (written and/or practical)

Final grade will be of letter type:  
C = 79 to 70 points
A = 100 to 90 points
B = 89 to 80 points
I = Incomplete

Other course requirements: This course will require the completion of various web based courses by a due date set by the instructor. The list of requirements and due dates will be given throughout the semester. Incomplete programs are not an option at semester's end.

Web Base Training:

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<th>Course #</th>
<th>Description</th>
<th>Due date</th>
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Safety concerns and rules: This course requires very close attention to safety.
- We may be handling heavy, sharp, and awkward components; so it is extremely important to wear only closed toed shoes, “steel toed” if possible. (No sandals or similar shoes.) If you come to class with improper foot wear you will be sent home and will receive no credit for the day or any of the activities scheduled.
- Z-87 eye protection WILL be worn at all times. (CLEAR LENSES ONLY)
- We will be using many specialized tools and adapters you must ensure that the tools are properly. Using the service manuals or tool instructions will help to ensure correct tool usage. If you are not sure please ask the instructor. If you find a tool to be damaged please inform your instructor and the tool room attendant on staff.

Student Learning Outcomes:
- Identify and explain the operation of emission, ignition, fuel, and computerized engine performance components
- Analyze and understand the operation of emission, ignition, fuel, and computerized engine performance systems
- Perform common diagnostic tests of the emission, ignition, fuel, and computerized engine performance systems in accordance with industry guidelines
- Troubleshoot and service emission, ignition, fuel, and computerized engine performance systems utilizing advanced diagnostic equipment in accordance with industry guidelines

Additional College/District Policies
For the college and district policies, view the document online at:
http://www.brookhavencollege.edu/employees/faculty/documents/BCSyllabus_Addendum.pdf