**DET 190 Course Outline as of Spring 2002**

# CATALOG INFORMATION

Dept and Nbr: DET 190 Title: ALTERNATIVE FUELS & SYS
Full Title: Alternative Fuels and Fuel Systems
Last Reviewed: 2/13/2006

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 2.00 | Lecture Scheduled | 3.00 | 8 | Lecture Scheduled | 24.00 |
| Minimum | 2.00 | Lab Scheduled | 3.00 | 8 | Lab Scheduled | 24.00 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 6.00 | | Contact Total | 48.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 48.00 Total Student Learning Hours: 96.00

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| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade Only |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | |

**Catalog Description:**
This course will provide an introduction to non-traditional internal combustion engine fuels, including natural gas, bio-fuels, and related alternative fuels, and the fuel systems for each.

**Prerequisites/Corequisites:**

**Recommended Preparation:**
DET 64. Students should have a good understanding of internal combustion engine structure.

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: This course will provide an introduction to non-traditional internal combustion engine fuels, including natural gas, bio-fuels, and related alternative fuels, and the fuel systems for each. (Grade Only)
Prerequisites/Corequisites:
Recommended: DET 64. Students should have a good understanding of internal combustion engine structure.
Limits on Enrollment:

Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

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|---|---|---|---|
| **AS Degree:** | **Area** | Effective: | Inactive: |
| **CSU GE:** | **Transfer Area** | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | Effective: | Inactive: |

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| **CSU Transfer:** | Effective: | Inactive: |
| **UC Transfer:** | Effective: | Inactive: |

**CID:**

**Certificate/Major Applicable:**
Certificate Applicable Course

## COURSE CONTENT

**Outcomes and Objectives:**
Upon successful completion of the course students will be able to:
1. Differentiate between traditional and "alternative" fuel.
2. Identify U.S. Department of Energy fuels classified as "alternative" to gasoline.
3. Discuss the benefits of alternative fuels.
4. Discuss clean air legislation.
5. Explain the origin, manufacture and use of alternative fuels.
6. Relate specific alternative fuels to their appropriate application.
7. Define fuel system and system component operations.
8. List components required to construct a natural gas pumping station.
9. Explain safe procedures for fuel handling.
10. Employ maintenance directions related to alternative fuel system care.
11. Perform inspection and testing procedures for alternative fuel systems.
12. Assess maintenance and repair needs on specific units.
13. Discuss and apply personal, shop, and environmental safety procedures.

**Topics and Scope:**

1. Clean fuels: An Overview
   a. traditional fuels
   b. alternative fuels
   c. clean air legislation
2. Fuel types, origin and manufacturing
   a. refined fuels
   b. bio-fuels
   c. gaseous fuels

3. Alternative fuel systems
   a. fuel injection
   b. compressed gas systems
   c. liquefied gas systems
   d. vehicle fueling stations
4. Fuel handling safety procedures
   a. personal
   b. environmental
   c. regulations
5. Fuel and fuel system maintenance and repairs
   a. scheduled maintenance
   b. system diagnosis
   c. component repair or replacement

**Assignment:**

1. Readings and discussion of traditional and alternative fuels.
2. Report on clean air act and current and pending fuel legislation.
3. Field trips to local alternative fuel facilities and refining facility.
4. Field notes.
5. Perform efficiency tests on alternative fuel systems and write analyses.
6. Write recommendations regarding needed adjustments or repairs.
7. Maintenance and repair/replacement activities.

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| Written homework, Reading reports, Lab reports | Writing<br>10 - 20% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Lab reports, Quizzes, Exams | Problem solving<br>10 - 30% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| Class performances, Performance exams | Skill Demonstrations<br>20 - 40% |

**Exams:** All forms of formal testing, other than skill performance exams.

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| Multiple choice, True/false, Matching items, Completion | Exams<br>20 - 40% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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| Attendance and participation. | Other Category<br>5 - 10% |

**Representative Textbooks and Materials:**
Richard L. Bechtold, Alternative Fuels Guidebook: Properties, Storage, Dispensing, and Vehicle Facility Modifications. Society of Automotive Engineers, 1997 and instructor provided materials.