

## **Fuel Systems (DEMR 1313)**



**Credit:** 3 semester credit hours (3 hours lecture)

**Prerequisite/Co-requisite:** N/A

### **Course Description**

In-depth coverage of fuel injector pumps and injection systems.

### **Required Textbook and Materials**

1. Diesel Technology Fundamentals / Service / Repair  
Author: Norman, Corinchock, Scharff  
Publisher: Goodheart and Willcox Company, Inc.  
ISBN # 1-59070-770-2
2. Diesel Technology Workbook Fundamentals / Service / Repair  
Author: Norman, Corinchock, Scharff  
Publisher: Goodheart and Willcox Company, Inc  
ISBN # 1-59070-771-0
3. Glossary of Technical Terms Fundamentals of Service  
Author: Deere and Company  
ISBN # 0-86691-321-1 ; 2<sup>nd</sup> edition
4. Notebook and 8.5" x 11" notebook paper

### **Course Objectives**

Upon completion of this course, the student will be able to:

1. Identify various components of injector pumps and systems. SCANS: C1.3, C6.3, C14.2, F1.4, F2.4, F3.2, F6.2, F9.3, F10.4, F11.4, F13.4, F17.2
2. List and explain the five major jobs of a diesel fuel system. SCANS: C1.3, C6.3, C14.2, F1.4, F2.4, F3.2, F6.2, F9.3, F10.4, F11.4, F13.4, F17.2
3. Name and describe the function of fuels and engine oils used in a diesel engine. SCANS: C1.3, C6.3, C14.2, F1.4, F2.4, F3.2, F6.2, F9.3, F10.4
4. Know the operation fundamentals of the basic fuel system. SCANS: C1.3, C6.3, C14.2, F1.4, F2.4, F3.2, F6.2, F9.3, F10.4, F11.4, F13.4, F17.2
5. List the four primary tasks of lubricating oil and their properties. SCANS: C1.3, C6.3, C14.2, F1.4, F2.4, F3.2, F6.2, F9.3, F10.4, F11.4, F13.4, F17.2

### **SCANS Skills and Competencies**

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job.

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### Course Syllabi

In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that “workplace know-how” consists of two elements: foundation skills and workplace competencies.

### Course Outline

- A.) Introduction
  - 1. Introduction of faculty and students
  - 2. Review Syllabus
  - 3. Review Class Policies
  - 4. Reviewing Student Enrollment
- B.) Lubrication Systems
  - 1. Lubricating Systems Functions
  - 2. Lubrication System Components and Types of Lubrication Systems
  - 3. Types of Oil Coolers and Servicing
  - 4. Oil Pressure Relief Valve Functions and Types
  - 5. Types of Oil Filters and Servicing
  - 6. Oil Pressure Indication Systems
  - 7. Engine Oils and API Service Classification
  - 8. Oil Analysis
- C.) Diesel Fuels
  - 1. Hydrocarbon Fuels, Relative Volatility, and Distillation
  - 2. Diesel Fuel Grades, Properties, and Qualities
  - 3. Fuel Additives Handling and Storage
  - 4. Alternative Fuels Uses and Types
- D.) Basic Fuel Systems
  - 1. Fuel System Components and Operating Fundamentals
  - 2. Fuel Tanks Inspection and Service
  - 3. Fuel Lines Types and Uses
  - 4. Fuel Transfer Pumps Operation and Service
- E.) Fuel Filters and Conditioners
  - 1. Damage by Dirt and Water
  - 2. Filtration Devices and Systems
  - 3. Servicing Filters
- F.) Injection System Fundamentals
  - 1. Diesel Fuel Injection Systems
  - 2. Timing and Metering of Fuel Systems
  - 3. Electronic Metering Systems Operations
- G.) Injection Nozzles Holders, Constructions, and Types
  - 1. Servicing Fuel Injector Holders and Nozzles
  - 2. Pencil Nozzles Operation and Service

### Grade Scale

90 – 100	=	A
80 – 89.9	=	B
70 – 79.9	=	C
60 – 69.9	=	D
0 – 59.9	=	F

### Course Evaluation

Final grades will be calculated according to the following criteria:

Daily work, quizzes, and homework assignment.	<b>40%</b>
Test over Lecture and Chapters	<b>30%</b>
Outside assignment or class presentation.	<b>10%</b>
<u>Final Exam</u>	<b>20%</b>

### **Course Requirements**

1. Complete specific reading assignments in a timely manner specified by the instructor.
2. Seek out available material on the subject being taught, utilizing the library, periodicals and / or the Internet.
3. Wear sleeved shirts, full length jeans or work pants and preferably leather shoes to class and on campus. No shorts or tank tops are allowed.
4. Participate in project interview when offered.
5. Complete all work book and class assignments.
6. Be present at class sessions and examinations as scheduled.

### **Attendance Policy**

1. Missing more than 20% of classes will result in an automatic “F” for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

If you wish to drop, you are responsible for the drop process. I will not initiate the drop, no matter how many absences or zeroes you have; that is, if you stop coming to class and do not drop, you will earn an F in the course.

***Students are allowed only 6 drops, from any public Institute of higher education, in their lifetime.***

### **Course Policies**

1. **No Cell Phone or Electronic Devices** allowed in class, unless it is known to the instructor, for a special reasoning.  
***All cell phones must be turned off and put away. Text messaging during class time will not be tolerated. Text messaging during an exam will be considered academic dishonesty. The exam will be considered over and the student will receive a zero for the exam.***
2. **No** smoking or use of any **tobacco** products allowed
3. Do not bring any **food** or **drinks** in class
4. No visitor allowed in class including children
5. **Do not disturb lecture for any reason. If you must leave class or come in late, do so without disturbing class.**
6. **DRESS CODE: Proper work attire only, NO Open shoes, Short pants, low riding, or sleeveless shirts, will be allowed in any program classrooms.**
7. **No** grades will be **dropped**, No homework or assignments can be made up or accepted after instructor has taken up for grading.
8. **Homework** must be done **in proper outline form, neat and legible**, prepared on **loose leaf (8.5” X 11”) note book paper**, written only on **one** side.
9. Assignment must be turn in at the beginning of class
10. Any student caught cheating will be dropped from class and given an F for the semester grade.

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11. Students are required to be present for all examinations and lectures.
12. Learning activities will be subjectively graded by the instructor. Students assigned to a group must be present at all times when the project is being worked on.

#### NOTE:

Students who violate any of these policies will be asked to leave class and given an absent for the class period. Students who are continuing disturbing classes will be suspended from class for the remainder of the semester and given an grade of F.

*Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.*

### Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

### Course Schedule

Week	Topic	Reference
1	Course introduction and policies <ul style="list-style-type: none"><li>• Review student schedules</li><li>• Lecture on syllabus and policies</li></ul>	Handouts
2-3	Lubrication Systems <ul style="list-style-type: none"><li>• Lubricating Systems Functions</li><li>• Lecture from textbook</li><li>• Test over system</li></ul>	Chapter 10
4-5	Engine Oils and API Service Classification <ul style="list-style-type: none"><li>• Oil Analysis</li><li>• Lecture from power point</li></ul>	Chapter 10
6-7	Diesel Fuels <ul style="list-style-type: none"><li>• Hydrocarbon Fuels, Relative Volatility, and Distillation</li><li>• Lecture from text book</li><li>• Test over fuels</li></ul>	Chapter 14
8-9	Basic Fuel Systems <ul style="list-style-type: none"><li>• Fuel System Components and Operating Fundamentals</li><li>• Lecture and teaching aids</li></ul>	Chapter 15

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<b>Week</b>	<b>Topic</b>	<b>Reference</b>
10-11	Fuel Filters and Conditioners <ul style="list-style-type: none"><li>• Damage by Dirt and Water</li><li>• Lecture</li><li>• Test over last 4 weeks</li></ul>	Chapters 16
12-13	Injection System Fundamentals <ul style="list-style-type: none"><li>• Diesel Fuel Injection Systems</li><li>• Lecture</li></ul>	Chapters 17
14-15	Injection Nozzles <ul style="list-style-type: none"><li>• Nozzle Holders, Constructions, and Types</li><li>• Lecture from text book</li><li>• Test on injectors</li></ul>	Chapter 18
16	Final Project, review and final exam <ul style="list-style-type: none"><li>• Semester review on material taught</li><li>• Final exam to be announced</li></ul>	Handout

The course schedule is a proposed schedule. Changes in the schedule may be made based upon the instructor's professional judgment. If you are absent on a day in which changes to the schedule have been announced, it is your responsibility to find out those changes.

REV 1/16/13

**Contact Information**  
**Varies by Instructors**