

## **Diesel Engines I (DEMR 1306)**



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

**Co-requisite:** DEMR 1401

### **Course Description**

An introduction to the basic principles of diesel engines and systems.

### **Required Textbook and Materials**

1. Diesel Technology Fundamentals / Service / Repair 2007  
Author: Norman, Corinchock, Scharff  
Publisher: Goodheart and Willcox Company, Inc.  
ISBN # 1-59070-770-2
2. Diesel Technology Workbook Fundamentals / Service / Repair 2007  
Author: Norman, Corinchock, Scharff  
Publisher: Goodheart and Willcox Company, Inc  
ISBN # 1-59070-771-0
3. Glossary of Technical Terms Fundamentals of Service 1999  
Author: Deere and Company  
ISBN # 0-86691-321-1 ; 2<sup>nd</sup> edition
4. Notebook and 8.5" x 11" notebook paper
5. Blue and Black ink pens

### **Course Objectives**

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

- A. Describe the history of diesel engines and diesel systems and their Evolution.  
SCANS: F1.4, F2.4, F5.3, F5.4, F9.3, F14.3, C1.5, C2.5, C9.4, C15.3, C20.3
- B. Demonstrate knowledge of the basic principles of diesel systems and engines and how they function. SCANS: F1.4, F2.4, F5.4, F7.4, F8.3, F9.3, F10.2, F11.2, F12.3, F14.3, F15.2, F17.1, C1.5, C2.5, C3.2, C5.3, C7.3, C9.4, C13.2, C14.3, C15.3, C16.3, C18.2, C19.1, C20.3
- C. Demonstrate knowledge precision instruments to diagnose and repair basic systems and engines. SCANS: F1.4, F2.4, F3.3, F4.1, F5.4, F7.4, F8.3, F9.3, F10.2, F11.2, F12.3, F14.3, F15.2, F17.1, C1.5, C2.5, C3.2, C5.3, C7.3, C9.4,2, C14.3, C15.3, C16.3, C18.2, C19.1, C20

### **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

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settings to determine what knowledge workers needed in order to perform well on a job. 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**

- I. Introduction
  - A. Introduction of faculty and students
  - B. Review Syllabus
  - C. Review Class Policies
  - D. Review Student Enrollment
- II. Career Opportunities
  - A. The Diesel Field
  - B. Employment Availability and Wages
  - C. Teaching Positions and Requirements
  - D. Certification and Specialists
  - E. Working in the Field
- III. Introduction to Diesel Engines
  - A. Diesel Versus Gasoline
  - B. Diesel Drawbacks
  - C. Diesel Engine History
  - D. Early Theories and Successes
  - E. The Development of the Diesel Engine
  - F. Continued Development of the Diesel Engine
  - G. Modern Diesel Applications
  - H. Modifications to Increase Diesel Engine Efficiency
- IV. Principles of Operation
  - A. Major Engine Components Designs and Functions
  - B. Types of Diesel Engine Classification
  - C. Four-Stroke Cycle Operation
  - D. Two-Stroke Cycle Engine Operation
  - E. Cylinder Number and Configuration of the Engine
- V. Combustion Chamber Designs
  - A. Types of Fuel Injection Systems
  - B. Engine Performance Terms and Formulas
  - C. Development of Horsepower and Torque
- VI. Air Intake Systems
  - A. Effects of Air Intakes
  - B. Type and Function of Scavenging and Superchargers
  - C. Use and Types of Air Cleaners
  - D. Dry Air Filter Elements
  - E. Additional Service Tips
  - F. Servicing the Air Filter Elements
  - G. Intake Air Silencers Operations
  - H. Blowers and Supercharger Types
- VII. Exhaust Systems
  - A. Environmental Regulations and Back pressure
  - B. Exhaust System Components
  - C. Types of Mufflers
  - D. Mufflers Used on Turbocharged Engines
  - E. Exhaust System Service
  - F. Turbocharger Components and Operation
  - G. Turbocharger Advantages and Lubrication
  - H. Turbocharger Inspection and Troubleshooting

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|--|---|
| I. Turbocharger Removal and Installation           | M. Controlling Diesel Engine Emissions                    |
| J. After coolers (Intercoolers) Types and Services | N. Catalytic Converter or Silencer Operations and Designs |
| K. Exhaust Pyrometers Uses                         |   |
| L. Exhaust Brakes Systems                          |   |

**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, except in special circumstances and it is approved by the instructor.  
*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.

### NOTE:

**Students who violate any of these policies will be asked to leave class and will be recorded as absent for the class period. Students who continue to disturb classes will be suspended from class for the remainder of the semester and receive a 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 • Lecture	Handouts
2-3	Career Opportunities	Chapter 30

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<b>Week</b>	<b>Topic</b>	<b>Reference</b>
	<ul style="list-style-type: none"><li>• Lecture on applications</li><li>• Test over chapter 30</li></ul>	
4	Diesel Engine History <ul style="list-style-type: none"><li>• Early Theories and Successes</li><li>• The Development of the Diesel Engine</li><li>• Lecture</li></ul>	Chapter 1
5-6	Diesel Versus Gasoline <ul style="list-style-type: none"><li>• Lecture / Diesel Drawbacks</li><li>• Test over chapter 1</li></ul>	Chapter 1
7-10	Principles of Operation <ul style="list-style-type: none"><li>• Major Engine Components Designs and Functions</li><li>• Types of Diesel Engine Classification</li><li>• Test over chapter 4</li></ul>	Chapter 4
11-13	Air Intake Systems <ul style="list-style-type: none"><li>• Effects of Air Intakes</li><li>• Type and Function of Scavenging and Superchargers</li><li>• Test over chapter 12</li></ul>	Chapters 12
14-15	Exhaust Systems <ul style="list-style-type: none"><li>• Environmental Regulations and Back pressure</li><li>• Exhaust System Components</li><li>• Test over chapter 13</li></ul>	Chapters 13
16	Review and Final Exam	Handouts

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.

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