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 related systems.

Required Textbook and Materials
1. Diesel Technology Fundamentals, Service, Repair
   Author: Norman, Corinchock, Scharff
   Publisher: Goodheart and Willcox Company, Inc.
   ISBN # 978-1-61960-832-0, 8th edition
2. Diesel Technology Workbook Fundamentals, Service, Repair
   Author: Norman, Corinchock, Scharff
   Publisher: Goodheart and Willcox Company, Inc
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.
B. Demonstrate knowledge of the basic principles of diesel systems and engines and how they function.
C. Demonstrate knowledge precision instruments to diagnose and repair basic systems and engines.

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

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. 40%
- Test over Lecture and Chapters 30%
- Outside assignment or class presentation. 10%
- Final Exam 20%

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 online resource: [http://www.lit.edu/depts/stuserv/special/defaults.aspx](http://www.lit.edu/depts/stuserv/special/defaults.aspx)

**Student Code of Conduct Statement**
It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at [www.lit.edu](http://www.lit.edu) or obtained in print upon request at the Student Services Office.

**Starfish**
LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.
## Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course introduction and policies</td>
<td>Handouts</td>
</tr>
<tr>
<td></td>
<td>• Lecture</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>Career Opportunities and ASE Certification</td>
<td>Chapter 28</td>
</tr>
<tr>
<td></td>
<td>• Lecture on applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Test over chapter 28</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Workplace Employability Skills</td>
<td>Chapter 29</td>
</tr>
<tr>
<td></td>
<td>• Lecture on applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Test over chapter 28</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>Diesel Engine History</td>
<td>Chapter 1</td>
</tr>
<tr>
<td></td>
<td>• Early Theories and Successes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Development of the Diesel Engine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diesel Versus Gasoline</td>
<td>Chapter 1</td>
</tr>
<tr>
<td></td>
<td>• Lecture / Diesel Drawbacks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Test over chapter 1</td>
<td></td>
</tr>
<tr>
<td>7-10</td>
<td>Principles of Operation</td>
<td>Chapter 4</td>
</tr>
<tr>
<td></td>
<td>• Major Engine Components Designs and Functions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Types of Diesel Engine Classification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Test over chapter 4</td>
<td></td>
</tr>
<tr>
<td>11-13</td>
<td>Air Intake Systems</td>
<td>Chapters 12</td>
</tr>
<tr>
<td></td>
<td>• Effects of Air Intakes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Type and Function of Scavenging and Superchargers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Test over chapter 12</td>
<td></td>
</tr>
<tr>
<td>14-15</td>
<td>Exhaust Systems</td>
<td>Chapters 13</td>
</tr>
<tr>
<td>Week</td>
<td>Topic</td>
<td>Reference</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>• Environmental Regulations and Back pressure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Exhaust System Components</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Test over chapter 13</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Review and Final Exam</td>
<td>Handouts</td>
</tr>
</tbody>
</table>

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 1-15-2020