

## **COURSE TITLE Diesel Engines I (DEMR 1306 3&5A2)**

### **CREDIT**

3 Semester Credit Hours (3 hours lecture, 1 hour Lab)

### **MODE OF INSTRUCTION**

Face to Face

### **PREREQUISITE/CO-REQUISITE:**

Co-Requisite :(DEMR 1401)

### **COURSE DESCRIPTION**

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

### **COURSE OBJECTIVES**

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

1. Describe the history of diesel engines and diesel systems and their Evolution.
2. Demonstrate knowledge of the basic principles of diesel systems and engines and how they function.
3. Demonstrate knowledge precision instruments to diagnose and repair basic systems and engines.

### **INSTRUCTOR CONTACT INFORMATION**

Instructor: Pete Matak III

Email: pmatak@lit.edu

Office Phone: 409 247 5058

Office Location: ITC-2 104

Office Hours: Monday / Wednesday 1:30 – 2:30 pm during semester

### **REQUIRED TEXTBOOK AND MATERIALS**

1. Diesel Technology Fundamentals, Service, Repair  
Author: Norman, Corinchock, Scharff  
Publisher: Goodheart and Willcox Company, Inc.  
ISBN # 978-1-64564-685-3 9<sup>th</sup> edition \*
2. Diesel Technology Workbook Fundamentals, Service, Repair  
Author: Norman, Corinchock, Scharff  
Publisher: Goodheart and Willcox Company, Inc  
ISBN # 978-1-64564-686-0 9<sup>th</sup> edition \*
4. Notebook and 8.5" x 11" notebook pape



**LAMAR INSTITUTE  
OF TECHNOLOGY**

5. Blue and Black ink pens

**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.

**DROP POLICY**

If you wish to drop a course, you are responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an “F” in the course.

**COURSE CALENDAR**

| Date      | TOPIC  | READINGS<br>( Due this Date)  | ASSIGNMENTS<br>(Due this Date)   |
|-----------|--|---|--|
| 8-26-2024 | Course Introduction and Class Policies<br>Career Opportunities and ASE Certification | Lecture / Handouts<br>Student Blackboard<br>Chapter 28<br>Lecture on applications<br>Test over chapter 28<br>9-5-2024   | Review Handouts and Class Quizzes<br>Complete assigned Review, ASE and Workbook Questions.<br>Class Quizzes<br>Chapter 28 Test<br>9-5-2024 |
|           |  |   |  |
| 9-9-2024  | Workplace Employability Skills<br>Diesel Engine History                              | Chapter 29<br>Lecture on applications<br>Test over chapter 29<br>Chapter 1<br>Lecture<br>Early Theories and Success<br>The Development of the Diesel Engine<br>Diesel Versus Gasoline<br>Lecture / Diesel Drawbacks<br>Test over chapter 1<br>9-19-2024 | Complete assigned Review, ASE and Workbook Questions.<br>Class Quizzes<br>Chapter 29 Test<br>Chapter 1 Test<br>9-19-2024                   |
|           |  |   |  |

|           |  |  |   |
|-----------|--|--|---|
| 9-23-2024 | Principles of Operation<br>Air Intake Systems              | Chapters 4<br>Lecture<br>Major Engine Components<br>Designs and Functions<br>Types of Diesel Engine<br>Classification<br>Chapters 12<br>Lecture<br>Effects of Air Intakes<br>Type and Function of<br>Scavenging and<br>Superchargers<br>Test over chapter 12<br>Test over chapter 4<br>10-3-2024 | Complete assigned<br>Review, ASE and<br>Workbook Questions.<br>Class Quizzes<br>Chapter 4 Test<br>Chapter 12 Test<br>10-3-2024                          |
|           |  |  |   |
| 10-7-2024 | Exhaust Systems<br>Final Project, Review and<br>Final Exam | Chapter 13<br>Lecture<br>Environmental Regulations<br>and Back pressure<br>Exhaust System<br>Components<br>Test over chapter 13<br>Prepare for final exam<br>Lecture<br>10-17-2024   | Complete assigned<br>Review, ASE and<br>Workbook Questions.<br>Class Quizzes<br>Chapter 13 Test<br>Review semester<br>completed materials<br>10-17-2024 |
|           |  |  |   |

*Calendar dates are subject to change due to unforeseen circumstances.  
Check Blackboard for any changes in due dates.*

### **COURSE EVALUATION**

Final grades will be calculated according to the following criteria:

|   |                   |
|---|-------------------|
| Daily work, quizzes, and homework assignment. | <b>45%</b>        |
| Test over Lecture and Chapters                | <b>30%</b>        |
| Outside assignment or class participation.    | <b>5%</b>         |
| <u>Final Exam</u>                             | <b><u>20%</u></b> |
| <b>Total</b>                                  | <b>100%</b>       |

### **GRADE SCALE**

- 90-100      A

- 80-89.9 B
- 70-79.9 C
- 60-69.9 D
- 0-59.9 F

### **TECHNICAL REQUIREMENTS**

The latest technical requirements, including hardware, compatible browsers, operating systems, etc. can be online at <https://lit.edu/online-learning/online-learning-minimum-computer-requirements>. A functional broadband internet connection, such as DSL, cable, or WiFi is necessary to maximize the use of online technology and resources.

### **DISABILITIES STATEMENT**

The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. LIT provides reasonable accommodations as defined in the Rehabilitation Act of 1973, Section 504 and the Americans with Disabilities Act of 1990, to students with a diagnosed disability. The Special Populations Office is located in the Eagles' Nest Room 129 and helps foster a supportive and inclusive educational environment by maintaining partnerships with faculty and staff, as well as promoting awareness among all members of the Lamar Institute of Technology community. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409)-951-5708 or email [specialpopulations@lit.edu](mailto:specialpopulations@lit.edu). You may also visit the online resource at [Special Populations - Lamar Institute of Technology \(lit.edu\)](#).

### **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). Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document.

### **ARTIFICIAL INTELLIGENCE STATEMENT**

Lamar Institute of Technology (LIT) recognizes the recent advances in Artificial Intelligence (AI), such as ChatGPT, have changed the landscape of many career disciplines and will impact many students in and out of the classroom. To prepare students for their selected careers, LIT desires to guide students in the ethical use of these technologies and incorporate AI into classroom instruction and assignments appropriately. Appropriate use of these technologies is at the discretion of the instructor. Students are reminded that all submitted work must be their own original work unless otherwise specified. Students should contact their instructor with any questions as to the acceptable use of AI/ChatGPT in their courses

## 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.

## ADDITIONAL COURSE POLICIES/INFORMATION

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.
11. Students are required to be present for all examinations and lectures.
12. There is **NO MAKE-UP** for missing any quizzes or major test or exams.
13. 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.
14. Instructor will reply to students email in a reasonable time or within 3 working days.

## 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.*

## **Course Outline**

- A. Introduction
  - 1. Introduction of faculty and students
  - 2. Review Syllabus
  - 3. Review Class Policies
  - 4. Review Student Enrollment
- B. Career Opportunities
  - 1. The Diesel Field
  - 2. Employment Availability and Wages
  - 3. Teaching Positions and Requirements
  - 4. Certification and Specialists
  - 5. Working in the Field
- C.) Introduction to Diesel Engines
  - 1. Diesel Versus Gasoline
  - 2. Diesel Drawbacks
  - 3. Diesel Engine History
  - 4. Early Theories and Successes
  - 5. The Development of the Diesel Engine
  - 6. Continued Development of the Diesel Engine
  - 7. Modern Diesel Applications
  - 8. Modifications to Increase Diesel Engine Efficiency
- D.) Principles of Operation
  - 1. Major Engine Components Designs and Functions
  - 2. Types of Diesel Engine Classification
  - 3. Four-Stroke Cycle Operation
  - 4. Two-Stroke Cycle Engine Operation
  - 5. Cylinder Number and Configuration of the Engine
- E.) Combustion Chamber Designs
  - 1. Types of Fuel Injection Systems
  - 2. Engine Performance Terms and Formulas
  - 3. Development of Horsepower and Torque
- F.) Air Intake Systems
  - 1. Effects of Air Intakes
  - 2. Type and Function of Scavenging and Superchargers
  - 3. Use and Types of Air Cleaners
  - 4. Dry Air Filter Elements
  - 5. Additional Service Tips
  - 6. Servicing the Air Filter Elements
  - 7. Intake Air Silencers Operations
  - 8. Blowers and Supercharger Types

## G.) Exhaust Systems

1. Environmental Regulations and Back pressure
2. Exhaust System Components
3. Types of Mufflers
4. Mufflers Used on Turbocharged Engines
5. Exhaust System Service
6. Turbocharger Components and Operation
7. Turbocharger Advantages and Lubrication
8. Turbocharger Inspection and Troubleshooting
9. Turbocharger Removal and Installation
10. After coolers (Intercoolers) Types and Services
11. Exhaust Pyrometers Uses
12. Exhaust Brakes Systems
13. Controlling Diesel Engine Emissions
14. Catalytic Converter or Silencer Operations and Designs