

COURSE TITLE (Failure Analysis (DEMR 2348 6A2)

CREDIT

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

MODE OF INSTRUCTION

Face to Face

PREREQUISITE/CO-REQUISITE:

None

COURSE DESCRIPTION

An advanced course designed for analysis of typical part failures on equipment use with Diesel Engines.

COURSE OBJECTIVES

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

1. Identify the type of part failure using visual and special testing equipment.
2. Explain nondestructive testing procedures to identify failures.
3. Identify wear type and reasons for wear or failure.
4. List coolant system major components and functions.
5. Describe the service of valves and related components.

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 9th edition *
2. Diesel Technology Workbook Fundamentals, Service, Repair
Author: Norman, Corinchock, Scharff
Publisher: Goodheart and Willcox Company, Inc
ISBN # 978-1-64564-686-0 9th edition *

Approved: PMIII / 1-23-2023



4. Notebook and 8.5" x 11" notebook paper
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

Week	TOPIC	READINGS	ASSIGNMENTS
1	Course Introduction and Class Policies Engine Reassembly and Installation Establishing Good Work Habits Test Reassemble and installation	Lecture / Handouts Chapter 28	Review Handouts and Class Quizzes Complete assigned Review, ASE and Workbook Questions. Class Quizzes
2	Rebuilt Engine Run-In Procedures <ol style="list-style-type: none"> 1. Engine Dynamometer Run-In and 2. Chassis Dynamometer and Operation 3. Engine Installation into Vehicle 	Chapter 28	Complete assigned Review, ASE and Workbook Questions. Class Quizzes Chapter 28 Test
3	Cylinder Heads and Related Components <ol style="list-style-type: none"> 1. Cylinder Head and Proper Removal 2. Cylinder Head Inspection and Service 	Chapter 8	Complete assigned Review, ASE and Workbook Questions. Class Quizzes

4	Valves Inspection, Service, and Identification 1. Valve Guides, Springs, and Seats, Types, Inspection and Service 2. Test valve inspection	Chapter 8	Complete assigned Review, ASE and Workbook Questions. Class Quizzes Chapter 8 Test
5	Camshaft and Valve Train Components 1. Valve Train Operating Mechanisms 2. Lecture / chapter test	Chapters 9	Complete assigned Review, ASE and Workbook Questions. Class Quizzes Chapter 9 Test
6	Cooling Systems 1. Types of Cooling Systems, Coolants, Radiator Systems, Surge Tanks, Radiators, and Radiator Fan Shroud 2. Test cooling system	Chapters 11	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
7	Industrial Engine Cooling Systems 1. Marine Engine Cooling System	Chapter 11	Complete assigned Review, ASE and Workbook Questions. Class Quizzes Chapter 11 Test
8	Final Project, Review and Final Exam 1. Lecture	Prepare for final exam	Review semester materials

COURSE EVALUATION

Final grades will be calculated according to the following criteria:

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

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

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. 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.

Course Outline

A.) Introduction

1. Introduction of faculty and students
2. Review Syllabus
3. Review Class Policies
4. Reviewing Student Enrollment

B.) Engine Reassembly and Installation

1. Establishing Good Work Habits
2. Inspection and reassembly of Cylinder Block, Sleeves, and Crankshaft Assembly
3. Timing of Inline or Distributor Injection Pumps
4. Cylinder Head Reassembly and Installation
5. Unit Fuel Injectors
6. Rebuilt Engine Run-In Procedures
7. Engine Dynamometer Run-In and Chassis Dynamometer and Operation
8. Engine Installation into Vehicle

C.) Cylinder Heads and Related Components

1. Cylinder Head and Proper Removal
2. Cylinder Head Inspection and Service
3. Valves Inspection, Service, and Identification
4. Valve Guides, Springs, and Seats, Types, Inspection and Service

D.) Camshaft and Valve Train Components

1. Valve Train Operating Mechanisms
2. Inspecting and Servicing the Valve Train
3. Assembling the Valve Train Components

E.) Cooling Systems

1. Types of Cooling Systems, Coolants, Radiator Systems, Surge Tanks, Radiators, and Radiator Fan Shroud
2. Hoses and Radiator Outlets
3. Cleaning and Replacing Cooling System Components
4. Water Manifolds, Water Pumps, and V-Belt Drives
5. Suction Fans and Blower Fans
6. Industrial Engine Cooling Systems
7. Marine Engine Cooling System