

Fall 2017

DIESEL TECHNOLOGY 131

Alternative Fueled Engine Overhaul Engines

Diesel Engines IV

Term:	Fall 2017
CRN:	49422
Instructor:	Mr. Dan Willkie, Mr. Gene Choe
Class Location:	C100/ C2-101
Office Location:	C3-104
Office Hours:	Posted by door.
Office Phone:	(619)-388-7527
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Course Title:	Diesel 131
Subject Area:	Alternative Fueled Engines
Class Meets:	21 Aug. 2017 to 13 Dec. 2017
Monday:	5:30 pm to 8:40 pm
Wednesday:	5:30 pm to 8:40 pm
Class Duration:	16 Weeks
Credit:	4 Units

Prerequisite:

Diesel Technology 100, or concurrent enrollment in Diesel Technology 100.

Course Description:

Theory and laboratory practice in disassembling, evaluation, rebuilding, and Dynamometer performance testing of CNG Powered Heavy Duty Engines. Field trip /s may be required.

Course Objectives:

Each student successfully completing this course will be able to explain the function, operation, maintenance, detect the need for and perform major overhaul operations on one of several models of Cummins powered CNG engines. Also, students will run their engines and evaluate their repair.

Course Student Learning Outcomes:

Each student will be able to demonstrate a basic understanding of CNG powered engines by: Identifying the major engine systems, identifying the location of major engine components, identifying the function of major engine components. Each student will demonstrate the ability to: Use service literature, disassemble the diesel engine, inspect the major components for serviceability, Reassemble the diesel engine, Run the engine for performance, Perform engine run in tests.

Class Evaluation:

Evaluation will be done in accordance with the Diesel Program policy. A student's grade will be based on multiple measures of performance. The assessment process will measure independent critical thinking skills and include evaluation of the student's ability to:

1. Perform the manipulative skills as needed to satisfactorily complete laboratory assignments.
2. Apply theory to laboratory assignments.
3. Perform on written, oral, and practical examinations.
4. Perform on outside assignments including writing assignments.
5. Contribute to class discussion.
6. Maintain attendance per current policy.

Cheating/Plagiarism:

Students are expected to be honest and ethical at all times in the pursuit of academic goals. Students who are found to be in violation of Administrative Procedure 3100.3 Honest Academic Conduct, will receive a grade of zero on the assignment, quiz, or exam in question and may be referred for disciplinary action in accordance with Administrative Procedure 3100.2, Student Disciplinary Procedures.

Each student is responsible for any and all course work missed while absent!

It is the student's responsibility to process add codes in a timely manner.

It is the student's responsibility to drop classes he/she is no longer attending. All students enrolled in the class after the drop deadline will receive a letter grade (Students who remain enrolled in a class beyond the published withdrawal deadline, as stated in the class schedule, will receive an evaluative letter grade in this class.)

Grading scale:

A	100% to 92%
B	91% to 83%
C	82% to 74%
D	73% to 65%
F	64% and below

Method of evaluation:

A. **Class grade:** is an average of all written examinations and quizzes = 40%

1. Test #1.
2. Test #2.
3. Test #3
4. Safety Test (averaged).
 - i. In class paper test.
 - ii. SP/2, Heavy-Duty Equipment and Diesel Technology Safety.
5. Quizzes.
 - i. Heavy-Duty Equipment and Diesel Pollution Prevention.
 - ii. Ethics and You in the automotive industry.
 - iii. Land That Job! Building a resume.
 - iv. Land That Job, Interview skills for automotive students.
 - v. Bullying in the work environment.
 - vi. Substance abuse awareness and management.

6. All tests and quizzes that are not completed by the date and time listed in this syllabus will receive score of zero (0).

B. **Shop Grade:** is an average of all shop projects and performance tests = 60%

1. Lab grade:
 - i. Overall shop grade.
 - ii. Shop notebook/Lab sheet.
 1. Engine Component Id.
 2. Engine Disassembly.
 3. Engine Reassembly.
 4. Engine Run-in.
 5. Engine Dyno run.
 2. All Tasksheets are due beginning of the class on the date due.
- a. Shop notebook/Lab sheet – The shop notebook/Lab sheet is an integral aspect of the lab portion of this course. Shop notebooks will be submitted six times during the semester.
- b. The completed shop notebook/Lab sheet will be printed and submitted (Handwritten notebooks will receive 0 points).
- c. The notebook/Lab sheet grades will be as follows:
5 - Points = **(A)** Complete strong notebook, all sections filled in.
4 - Points = **(B)** Good notebook, details.
2 - Points = **(C)** Min notebook, just ok.
1 - Points = **(D)** Poor or weak notebook sections incomplete.
0 - Points = **(F)** didn't submit notebook/Lab sheet.
- d. **Printed Tasksheets are due no later than 6:00 PM on turn-in day!**
- e. **Students may use the Diesel computer room to work on their Shop notebooks, on their time; after the engine class.**
- f. **The first day of shop notebooks/ Lab Sheet is: 28 Aug. 2017.**
- g. **The final notebook/ Lab Sheet is due by: 11 Dec. 2017.**

Tests:

There are regularly scheduled tests this semester. The test dates and reading assignments are in the last section of this syllabus. Tests will be two parts. The first part is an in class test. These questions directly relate to your assigned lab engine. You can only use your hand written lab notes. It has a value of 25 points. The second section is a 75 question multiple choice take home test. They will be passed out on the date listed and collected at the beginning of the following class. Students who are absent the day the test is passed out will be given 2 hours to complete the test and can use hand written notes and/or their own text book.

There are no make-up tests.

If a student fails to take the final they will fail the class.

SP/2:

The Diesel Program has implemented SP/2 online Training/ Testing. All students are required to take these tests during the semester. Your instructor will enter you into the system; and provide you with your log-in. The minimum passing score is 80%, and you make take the test up to 5 times.

SP/2: Note: Continuing students will have their SP/2 scores reset each August. Therefore, they must retest once a year.

Safety Test: Each student is required to take the in class safety test (program Specific; 25 - 50 questions) and the SP/2 on-line test. After successfully, passing the SP/2 each student will print the certificate and hand it to the **instructor prior to entering the lab.** The SP/2 safety test must be completed by **28 Aug 2017**.

Additional Tests:

1. Heavy-Duty Equipment and Diesel Pollution Prevention.
2. Ethics and You in the automotive industry.
3. Land That Job! Building a resume.
4. Land That Job, Interview skills for automotive students.
5. Bullying in the work environment.
6. Substance abuse awareness and management.

The aforementioned quizzes will be averaged together and become one of the classroom test scores. All six quizzes will be averaged together for the test score. If a student fails to take one or more of the quizzes will receive a **zero** for that quiz and the score will reflect that. All these quizzes must be completed by; **03 Nov. 2017**.

Continuing/ Returning Students: The SP/2 tests must be taken the student's first semester in the program's lab courses; and each subsequent **Fall Semester**. Returning students (Spring & Summer) must print the appropriate SP/2 test and submit it to the instructor the second week of class prior to entering the lab.

Multiple Lab Students: If a student is taking multiple lab classes. They are required to take and pass the SP/2 tests as outlined. However, after completing said tests, they can submit copies of their certificates to all their additional instructors (except Diesel 100).

Quizzes:

There could be random quizzes during the semester. If a student misses a quiz for any reason they will not get the opportunity to take the quiz. The quiz grade will be the average of all quizzes.

Shop Task Evaluation:

Shop task performance levels:

"A" (92 - 100) -- Can perform this skill without supervision and with initiative and adaptability to problem situations
(A⁺ = 98, A = 95, A⁻ = 92 points).

"B" (83 - 91) -- Can perform this skill satisfactorily without assistance or supervision
(B⁺ = 91, B = 87, B⁻ = 83 points).

"C" (74 - 82) -- Can perform this skill satisfactorily, but requires some assistance and/or supervision
(C⁺ = 82, C = 78, C⁻ = 74 points).

"D" (65 - 73) -- Can perform parts of this skill satisfactorily, but requires considerable assistance and/or supervision
(D⁺ = 73, D = 69, D⁻ = 65 points).

"F" (0 - 64) -- Cannot perform this skill
(F = 64 points).

The shop grade will depend on the following items:

1. Shop notebook/ Lab sheet.
2. Engine repair report.
3. Critical Thinking
4. Quality of work.
5. Productiveness.
6. Safety and use and care of tools and equipment.
7. Cleanliness and personal appearance.
8. Attitude:

Following instructions.
Willingness to work on various types of jobs.
Relationship with fellow students.
Serious approach to work and a desire to learn.
Relationship to customers.

Attendance:

Regular attendance and punctuality are important. Tardies and absences will be determined by a time clock. A student's final grade will be affected by poor attendance. Each student is allowed four absences during the 16 week session. Two tardies count as one absence. A student's grade will drop one letter grade for each absence in excess of four.

Students with an attendance or tardiness problem will have their final grade adjusted accordingly there is no make-up time.

Shop:

While working in the shop each student must wear the appropriate Footwear, clothes, and safety glasses **At All Times**. Coveralls are recommended. Tank tops, shorts, and open toe shoes are not appropriate. This type of clothing is not permitted in the lab at any time. A student who fails to dress appropriately will be dismissed and marked absent for that portion of the class.

Final grade:

40% - Classroom Performance. (Average of all tests)
60% - Lab Performance.

Daily requirement:

Each student is required to bring the following to every class session:

1. Textbook.
2. Writing utensils.
3. Appropriate Clothing for Lab work.

Method of Instruction:

Classroom instruction will be conducted by means of lectures and demonstrations directed toward the entire class. Lab instruction will be conducted by means of discussions and demonstrations for individual students or a small group (2 to 5 people) of students.

Outline of Topics:

1. Diesel theory and operation.
2. Diesel engine construction and application.
3. Diesel engine systems; fuel, intake air, exhaust, cooling, and lubrication.
4. Use of hand, power, machine, and special tools.
5. Written reports and repair records.
6. Engine disassembly, and reassembly.
7. Major engine component evaluation and repair.
8. Engine Dynamometer testing.

Textbooks:

1. Medium/ Heavy Duty Truck Engines, Fuel & Computerized Management Systems, 5th Ed. Bennett, Thomson (Required Text)
2. Cummins Service manual: ISL G 4021669. Volume #1 & #2.

Supplies:

- a. USB memory Stick; **1 Gig or greater.**
- b. Spiral bound notebook; for note-taking.
- c. Clipboard; for portable hard surface.
- d. Writing utensils. **Note red ink and markers are reserved for instructor use only**
- e. (2 Pair) Safety glasses with clear lenses.
- f. Mechanic or rubber type gloves (Nitrile).
- g. Ear plugs; for live engine work.
- h. Calculator.
- i. Ear Buds, for computer lab.
- j. **Appropriate clothing and footwear for shop work:**
- NO shorts, cut-offs, tank-tops, or open footwear will be allowed for shop work - Coveralls are recommended.

Test Dates:

##	Test #	Test-Passed out	Test-Collected	Collection Time
1	Test #1.	20 Sep. 8:35 pm	25 Sep.	5:30 pm
2	Test #2.	01 Nov. 8:35 pm	06 Nov.	5:30 pm
3	Final (Test #3).	11 Dec. 8:35 pm	13 Dec.	5:30 pm
4	SLOAC extra credit	11 Dec 5:30 pm.		
5	<u>All Lab sheets are due</u>	<u>11 Dec 11:00 pm</u> <u>2017</u>		

Tasksheet Due Dates (Tentative):

- | | |
|--------------------------------------|----------------------------------|
| 1. Tasksheet #1 (Component ID). | 06 Sep. 2017. |
| 2. Tasksheet #2 (Disassembly). | 29 Sep. 2017. |
| 3. Tasksheet #4 (Engine Reassembly). | 17 Nov. 2017. |
| 4. Tasksheet #5 (Lab Engine Run). | After Group runs their engine. |
| 5. Tasksheet #6 (Brake Dyno Run). | After Group runs the brake Dyno. |

Important Dates:

- | | | |
|--|------|---|
| 1. 21 Aug. | 2017 | First day of class. |
| 2. 01 Sep. | 2017 | Last day to receive, process and pay for add codes. |
| 3. 04 Sep. | 2017 | Holiday – Labor Day. |
| 4. 10 Oct. | 2017 | Withdrawal Deadline. |
| 5. 10 Nov. | 2017 | Holiday – Veterans Day. |
| 6. 20 th Nov. – 30 th Nov. | 2017 | Thanksgiving Break |
| 7. 16 Dec. | 2017 | Last Day of Class. |

Course content areas and hours may be adjusted by the instructor as appropriate.

Diesel Technology
Evening Engine Class Reading & Homework Assignments
DT-131 Detroit Diesel

Text: Medium/ Heavy Duty Truck Engines, Fuel & Computerized Management Systems, 5th.Ed.
Bennett, Thomson (Required Text)

Test #1; 20 Sep. 2017:

Chapter #4: Engine Basics.
Chapter #6: Power.
Chapter #7: Engine Powertrain Components.
Chapter #8: Engine Feedback Assembly.
Chapter #9: Engine Housing Components.

Test #2; 01 Nov. 2017:

Chapter #2: Pg.-29 to Pg. 39.
Chapter #10: Engine Lubrication Systems.
Chapter #11: Engine Cooling Systems.
Chapter #12: Engine Breathing.

Test #3; 11 Dec. 2017:

Chapter #15: Engine Removal, Disassembly, Cleaning, Inspection, and Reassembly.
Chapter #16: Engine Run-In & Performance Testing.
Chapter #38: Natural Gas, Propane, and Biodiesel fuels
Chapter #47: Emissions Management.

Note: Read the following Chapters the text.

Chapter #1: Introduction.
Chapter #2: Hand & Shop Tools, Precision Tools, & Units of Measurement.
Chapter #5: History of the Heat Engine.