



## Basic Course Information

Semester:	<b>Fall 2023</b>	Instructor Name:	<b>Pat Barbee</b>
Course Title & #:	<b>Diesel Engine Maintenance &amp; Repair AUT 140</b>	Email:	<a href="mailto:pat.barbee@imperial.edu">pat.barbee@imperial.edu</a>
CRN #:	<b>10919</b>	Webpage (optional):	
Classroom:	<b>1102</b>	Office #:	<b>1104 A</b>
Class Dates:	<b>August 15 - December 10</b>	Office Hours:	<b>Mondays/Wednesdays 11:10-12:10pm &amp; Tuesdays 5:00-6:00pm &amp; Thursdays 12:00-1:00pm</b>
Class Days:	<b>Mondays/Wednesdays</b>	Office Phone #:	
Class Times:	<b>8:00-11:10am</b>	Emergency Contact:	<b>Tisha Nelson: 760-355-6361</b>
Units:	<b>4.0</b>	Class Format:	<b>Face to Face</b>

## Course Description

This course provides the theory and skills for repairing diesel engines and related accessories. The proper procedures for disassembling, measuring, and rebuilding are covered. The complete engine is reviewed with emphasis on the status of engine components and to return it to service after proper reassembly, adjustments, and testing. (Nontransferable, AA/AS degree only)

## Course Prerequisite(s) and/or Corequisite(s)

None

## Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. Identify the differences between a natural aspirated engine and a manifold boosted engine.
2. Explain how energy of the fuels is converted to kinetic energy.
3. Explain engine torque, horsepower, and rating for diesel engines.
4. Explain volumetric efficiency, thermal efficiency, and total engine power.
5. Define the terms that describe basic diesel engine operation.



## Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. A. Identify safety procedures and shop equipment operation.
2. B. Apply the proper procedures to use the correct tools.
3. C. Troubleshoot major diesel engine component failures and related units.
4. D. Inspect and repair engine blocks.
5. E. Identify, inspect, and repair engine crankshafts.
6. F. Inspect and repair pistons, rings and connecting rods.
7. G. Inspect and repair cylinder heads and components.
8. H. Inspect and repair camshaft and related components.
9. I. Inspect and repair lubrication systems.
10. J. Inspect, service and repair cooling systems.
11. K. Test and troubleshoot engine performance.

## Textbooks & Other Resources or Links

Textbook Used: Diesel Engine Technology 9<sup>th</sup> Edition (ISBN 978-1-64564-685-3)

Access to computer, Internet, and word type applications.

Pen and pencils

Standard writing paper and notebook.

Lab days will require: Safety glasses, work footwear (no open toe shoes, slip resistant), proper shirts and pants.

## Course Requirements and Instructional Methods

This course will consist of a variety of instructional methods and assignments including, but not limited to, lectures, class discussions, group activities, a research paper, interviews, and hands-on shop experiences.

## Course Grading Based on Course Objectives

Grading System:

A – 513-570 of points = Excellent

B – 456-512 of points = Good

C – 399-455 of points = Acceptable

D – 342-398 of points = Below Average

F – 341 points and below = Failing

Activities	Points
Homework (13 assignments * 5pts each)	65
Quizzes (27 quizzes * 10pts each)	270
Labs (5 labs * 15pts each)	75
Mid-Term Exam	80
Final Exam	80
Total Points	570



\*\*\*There are no make-up exams unless arrangements with the instructor are made prior to exam.

## Course Policies

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink: Food and drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the General Catalog.
- Children in the classroom: Due to college rules and state laws, only students enrolled in the class may attend; children are not allowed.

**Academic honesty** in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property. There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

**Plagiarism** is taking and presenting as one's own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to cite a source correctly, you must ask for help.

**Cheating** is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question. Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the [General Catalog](#) for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following:

- plagiarism
- copying or attempting to copy from others during an examination or on an assignment
- communicating test information with another person during an examination
- allowing others to do an assignment or portion of an assignment
- using a commercial term paper service.

**Attendance:** A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See [General Catalog](#) for details.

Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed



the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.

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Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as excused absences.

## Other Course Information

### Shop/Lab Area Safety

- Safety test must be passed to work in the shop and complete required lab exercise.
- Safety glasses are required to be worn at all times while in the shop area, safety glasses are the student's responsibility (students not wearing safety glasses will be asked to leave lab for that day, no exceptions).
- Clean up your area and any other loose debris, trash, or spills.
- Wear all required safety protection and comply with posted signs.
- No shorts or open toe footwear, always be prepared for lab exercises.
- Comply with tool check out policy and clean tools before returning.
- Damaged or missing tools must be reported immediately. Tools are the students' responsibility.
- Do not perform any work on any vehicle outside the assigned task without permission from your instructor.
- Long hair must be kept in a ponytail or tucked away for safety.
- Jewelry such as rings and necklaces must be put away or tucked in for safety.
- Lab work will cease 20 minutes prior to end of class to allow time for cleaning areas and returning tools.

### Projects

- All projects must be approved by instructor and require a written work order.
- All projects must be removed from campus prior to finals.
- Projects are taken with students at end of class unless approved by instructor.

In addition to standard course curriculum, portions of this course will prepare you for ASE certifications.

## IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit <http://www.imperial.edu/studentresources> or click the heart icon in Canvas.

## Anticipated Class Schedule/Calendar

*[Provide a tentative overview of the readings, assignments, tests, and/or other activities for the duration of the course. A table format as in the example below may be used for this purpose.]*



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Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1	Syllabus & Introduction Shop Safety Test Chapter 1: Intro to Diesel Engines	Safety Test
Week 2	Chapter 3: Tools Precision Tools and Fasteners Chapter 4: Principles of Engine Operation	Review Questions & ASE Questions Pages 25-26 & 35-36
Week 3	Chapter 8: Cylinder Head & Related Components Chapter 9: Camshaft & Valve Train Components	Review Questions & ASE Questions Pages 59-60 & 85-86
Week 4	Chapter 6: Crankshafts Chapter 5: Engine Blocks	Review Questions & ASE Questions Pages 177-178 & 199-200
Week 5	Chapter 7: Pistons, Rings & Connecting Rods Chapter 10: Lubrication Systems	Review Questions & ASE Questions Pages 129-130 & 107-108
Week 6	Chapter 11: Cooling Systems Chapter 12: Air Intake Systems	Review Questions & ASE Questions Pages 152, 229-230
Week 7	Chapter 13: Exhaust Systems Chapter 14: Diesel Fuels	Review Questions & ASE Questions Pages 261-262 & 279-280
Week 8	Mid-Term Exam	
Week 9	Chapter 26: Engine Reassembly & Installation Chapter 14: Diesel Fuels	Review Questions & ASE Questions Pages 304-305 & 318-319
Week 10	Chapter 15: Basic Fuel Systems Chapter 16: Fuel Filter & Conditioners	Review Questions & ASE Questions Pages 543-544 & 318-319
Week 11	Chapter 17: Injection System Fundamentals Chapter 18: Injection Nozzles	Review Questions & ASE Questions Pages 335-336 & 347-348
Week 12	Chapter 19: Multiple Plunger Inline Injection Pumps Chapter 20: Distributor Injection Pumps	Review Questions & ASE Questions Pages 367-368 & 385-386
Week 13	Chapter 21 Unit Injection Fuel Injection Systems Chapter 22: Basics of Electricity	Review Questions & ASE Questions Pages 408, 423-424
Week 14	Chapter 23: Electronic Eng. Controls & Fuel Injection. Chapter 24: Diesel Engine Charging Systems	Review Questions & ASE Questions Pages 433-434 & 461
Week 15	<b>**NO CLASS THANKSGIVING BREAK**</b>	
Week 16	Chapter 25: Diesel Starting Systems Chapter 27: Preventative Maintenance & Troubleshooting	Review Questions & ASE Questions Pages 493-494 & 510-511
Week 17	Final Exam	



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**\*\*\*Subject to change without prior notice\*\*\***