IMPERIAL VALLEY COLLEGE

## Basic Course Information

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|---|---|---|---|
| Semester: | **Fall 2025** | Instructor Name: | **Pat Barbee** |
| Course Title & #: | **AUT 170 – Engine Diagnosis and Repair** | Email: | **pat.barbee@imperial.edu** |
| CRN #: | **10918** | Webpage (optional): | **N/A** |
| Classroom: | 1102 | Office #: | **1104 A** |
| Class Dates: | **August 11 th-December 6th** | Office Hours: | **Mondays/Wednesdays 11:10-12:10pm & Tuesdays 5:00-6:00pm & Thursdays 12:00-1:00pm** |
| Class Days: | **Tuesdays/Thursdays** | Office Phone #: | |
| Class Times: | **6:00-8:40pm** | Emergency Contact: | **Tisha Nelson: 760-355-6361** |
| Units: | **3.00** | Class Format: | **Face to Face** |

## Course Description

This course provides advanced operation and hands on experience of electronic injection systems and their sub-assemblies. Students will learn operation and repairs of sensors and actuators of injection systems. This class emphasizes diagnostic procedures and techniques using basic and sophisticated test equipment. (CSU) (CSU)

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

*N/A*

## 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. Research applicable vehicle and service information such as engine management system operation, vehicle service history, service precautions, and service technical bulletins. (ILO1, ILO2, ILO3)
2. Locate and interpret vehicle and major component identification numbers. (ILO1, ILO2, ILO3)
3. Check for module communication (including CAN/BUS systems) errors using a scan tool. (ILO1, ILO2, ILO3)

## Course Objectives

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

1. Learn about the automotive computer and its functions in relationship t electronic fuel injection. The student will learn how the computer takes in information processes and reacts to inputs. The student will study open and close loop theory and how it controls the fuel system.
2. Learn about sensors and actuators that control the engine operation. The student will learn how sensors send information to the computer to control fuel systems and engine timing. They will also learn proper test procedures for each compound.

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3. Learn throttle body, port fuel injection, mechanical and electronic fuel injection. The student will learn to recognize the difference between the systems; how they operated and how to diagnose each system.
4. Learn about turbo changer and supercharger systems and understand the components of each and how each system works. They will also learn how to make some basic diagnosis on these systems.
5. Student theory and operation of crankcase ventilation, air injection systems and catalytic converters and related components. They will learn how to properly diagnose and repair each system with use of four and five gas analyzer.
6. Learn theory and operation of electronic spark timing and why it is important to electronic fuel injection. The student will learn how to check timing and adjust or repair were it is applicable.
7. Learn what exhaust gas recirculation problems and the proper procedure for repair with the use of four and five analyzer.

## Textbooks & Other Resources or Links

Modern Automotive Technology by James E. Duffy ISBN: 978-1-63563-424-2 or Canvas Common Cartridge Access Key Code

**NO BOOK NO PASS!**

## 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 – 90%-100% of points = Excellent
B – 80%-89% of points = Good
C – 70%-79% of points = Acceptable
D – 60%-69% of points = Pass, less than satisfactory
F less than 60% of points = Failing

| | |
|---|---|
| Homework (14 assignments) | 30% |
| Quizzes (26 quizzes) | 10% |
| Labs (8 labs) | 30% |
| Midterm Exam | 25% |
| Final Exam | 25% |
| Total | 100% |

## 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 Campus Disciplinary Office before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the General Catalog.
  Assignment . IF YOU HAVE MISSED AN ASSIGNMENT IT WILL NOT BE GIVEN BACK FOR MAKEUP!

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.

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 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 responsibility (students not wearing safety glasses will be ask to leave the class for that day no exceptions).

• Clean up your area and any other lose debris or trash.

• Wear all required safety protection and comply with posted signs.

• No shorts or open toe foot wear, always be prepared to go into the lab area.

• Comply with tool check out policy and return tools clean.

• Do not perform any work on any vehicle outside the assigned task without permission from your instructor.

**Parking:**

No student parking by the building, the only exception is on lab time if your vehicle is a project (instructor approved). Speed limit must be kept at or under 5MPH.

Parking permit is required at all times.

**Projects:**

All projects are to be taken with the student's unless otherwise approve by the instructor.

All approve projects must be removed from campus prior to finals.

All projects must have a written work order (R/O).

**Shop Maintenance:**

All work will cease 20 minutes prior to end of class.

All work areas must be cleaned.

Tools must be cleaned and returned to the tool room.

Any broken or missing tools must be reported immediately. Tools are student's responsibility.

## 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.

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## Anticipated Class Schedule/Calendar

| Date or Week | Activity, Assignment, and/or Topic | Chapters/Tests |
|---|---|---|
| Week 1 | Syllabus<br>Chapter 5: Shop Safety | |
| Week 2 | Chapter 3: Basic Hand Tools | Pages 29-39 |
| Week 3 | Chapter 4 Power Tool and Equipment | Pages 42-52 |
| Week 4 | Chapter 7: Serive Information and workorders | Pages 78-84 |
| Week 5 | Chapter 8: Fasteners, Gaskets,seals and selant | Pages 87-96 |
| Week 6 | Chapter 18: Circuit Types & Ohms Law | Pages 172-173 & 182-183 |
| Week 7 | Chapter 19 Electric & Electronic Components<br>Chapter 28: 12-Volt & HV Batter Technology | Pages 209-210 |
| Week 8 | **Mid-Term Exam** | |
| Week 9 | Chapter 20: Electrical Tools & Test Equipment<br>Chapter 21: Wiring Diagrams& Wiring Repairs | Pages 224-227 & 365-367 |
| Week 10 | Chapter 22: Basic: Electrical Tests<br>Chapter 23: Computer System Service | Pages 224-227 & 259-261 |
| Week 11 | Chapter 24: On-Board Diagnostics & Scan Tools<br>Chapter 25: Computer System Service | Pages 276-277 & 293-294 |
| Week 12 | Chapter 34: Ignition System Technology<br>Chapter 35: Ignition System Diagnosis, Testing & Repair | Pages 305-307 & 319-321 |
| Week 13 | Chapter 39: Automotive Fuels & Combustion Efficiencies<br>Chapter 40: Fuel Tanks, Pump, Lines & Filters | Pages 444-445 & 458-459 |
| Week 14 | Chapter 41: Gasoline Injection Fundamentals<br>Chapter 42: Gasoline Injection Diagnosis & Repair | Pages 526-528 & 547-548 |
| Week 15 | ****NO CLASS THANKSGIVING BREAK**** | |
| Week 16 | Chapter 46: Turbochargers and Supercharger Construction,Operation, and Repair. | Pages 617-632 |
| Week 17 | **Final Exam** | |

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