IMPERIAL VALLEY COLLEGE

Basic Course Information

Semester:	**Fall 2023**	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 14th-December 9th**	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.

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

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

Homework (14 assignments * 5pts each)	70
Quizzes (26 quizzes * 10pts each)	260
Labs (8 labs * 10pts each)	80
Midterm Exam	80
Final Exam	80
Total	570

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. Persuant to IVC class policies. 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 Chapter 5: Shop Safety	
Week 2	Chapter 6: Automotive Measurements Chapter 7: Service Information & Work Orders	Pages 65-66
Week 3	Chapter 8: Fasteners, Gaskets, Seals & Sealants Chapter 11: Engine Fundamentals	Pages 75-76 & 85-86
Week 4	Chapter 12: Engine Desing Classification Chapter 13: Engine Top End Construction	Pages 98-99 & 140-141
Week 5	Chapter 14: Engine Bottom End Construction Chapter 15: Engine Front End Construction	Pages 149-150 & 160-161
Week 6	Chapter 18: Circuit Types & Ohms Law	Pages 172-173 & 182-183
Week 7	Chapter 19 Electric & Electronic Components Chapter 28: 12-Volt & HV Batter Technology	Pages 209-210
Week 8	**Mid-Term Exam**	
Week 9	Chapter 20: Electrical Tools & Test Equipment Chapter 21: Wiring Diagrams& Wiring Repairs	Pages 224-227 & 365-367
Week 10	Chapter 22: Basic: Electrical Tests Chapter 23: Computer System Service	Pages 224-227 & 259-261
Week 11	Chapter 24: On-Board Diagnostics & Scan Tools Chapter 25: Computer System Service	Pages 276-277 & 293-294
Week 12	Chapter 34: Ignition System Technology Chapter 35: Ignition System Diagnosis, Testing & Repair	Pages 305-307 & 319-321
Week 13	Chapter 39: Automotive Fuels & Combustion Efficiencies Chapter 40: Fuel Tanks, Pump, Lines & Filters	Pages 444-445 & 458-459
Week 14	Chapter 41: Gasoline Injection Fundamentals Chapter 42: Gasoline Injection Diagnosis & Repair	Pages 526-528 & 547-548
Week 15	****NO CLASS THANKSGIVING BREAK****	
Week 16	Chapter 47: Cooling System Technology Chapter 48: Cooling System Testing, Maintenance & Repair	Pages 565-566 & 587-589
Week 17	**Final Exam**	Pages 654-655 & 676-677

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