IMPERIAL VALLEY COLLEGE

Basic Course Information

Semester:	**Fall 2022**	Instructor Name:	**Julio Hernandez**
Course Title & #:	**ENGINE DIAGNOSIS & REPAIR AUT-170**	Email:	**julio.hernandez@imperial.edu**
CRN #:	**10918**	Webpage (optional):	**N/A**
Classroom:	**BLDG 1100**	Office #:	**1100 bldg.**
Class Dates:	**AUG. 15, 2022 – DEC. 10,2022**	Office Hours:	**N/A**
Class Days:	**TUESDAY & THURSDAY**	Office Phone #:	**N/A**
Class Times:	**6:00 PM - 8:40 PM**	Emergency Contact:	**Campus Nurse: (760)355-6128** **Campus Safety: (760)483-7411**
Units:	**3.0**	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

Method of Instruction: Methods of instructions may include, but are not limited to, the following: lectures, textbook worksheets, hands-on worksheets, internet readings, large and small group discussions, audiovisual aids, and demonstrations.
Reading and Writing: Reading articles from magazines, book chapters, answering questions, and/or writing short essays when directed.
What if I need to borrow technology or access to WIFI?
1. To request a loaner laptop, MYFI device, or other electronic device, please submit your request here: https://imperial.edu/students/student-equity-and-achievement/
2. If you'd like access the WIFI at the IVC campus, you can park in parking lots "I & J". Students must log into the IVC student WIFI by using their IVC email and password. The parking lots will be open Monday through Friday from 8:00 a.m. to 7:00 p.m.

Course Grading Based on Course Objectives

Grading Criteria:

1. Grading system:
    - A=90%-100% of points= Excellent

- B=80%-89% of points= Good
- C*=70%-79% of points= Satisfactory
- D= 60%-69% of points= Pass, less than satisfactory
- F= Less than 60% of points= Failing

2. Very important:
   - Mid-Term will be given on April 15.
   - Final-Exam will be given on June 10.
   - There are no make-up exams unless you have a very good reason and make arrangements with the instructor before the exam.
   - Final grades can be raised or lowered based on your preparation and participation in class. It benefits you to be engaged and participate.

Grades:

Quizzes + HW	25%
Shop/Lab Assignments	25%
Midterm Exam	25%
Final Exam	25%
Total	100%

Course Policies

• 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.

• What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.

Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

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.

Anticipated Class Schedule/Calendar

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 August 16 & 18	Syllabus, Course Intro, Shop Safety Shop: Safety Quiz + Shop Lay-up + Tools/ Equipment	CH. 5
Week 2 August 23 & 25	Engine fundamentals: Design + Classification Shop: 1) Identify the major parts of an engine. 2) Compare 2 different engines in design + performance, PCV and Intake.	CH. 11, CH. 12
Week 3 August 30 & September 1	AUTOMOTIVE ELECTRICAL CIRCUITS Diagnosis + Repair Shop: 1) Analyze Diagram logic, Electrical testing (multimeter), Wiring repair/solder. 2) Analyze engine control system (fuel + spark + timing) parameters with a scanner.	CH. 21
Week 4 September 6 & 8	IGNITION SYSTEMS TECHNOLOGY. Theory and design. Shop: 1) Identify and classify different types of ignition systems and main components. 2) Analyze the operation of a spark/timing control system using a scanner.	CH. 34

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 5 September 13 & 15	IGNITION SYSTEMS Diagnosis, Test + Repair Shop: 1) Identify faulty components by testing and comparing to specs. 2) Test ignition coils, relays, fuses, switches, cables.	CH. 35
Week 6 September 20 & 22	GASOLINE FUEL INJECTION SYSTEMS. Theory and design. Shop: 1) Identify the main components of two fuel injection systems. 2) Evaluate an Electronic fuel metering control with a scanner.	CH. 41
Week 7 September 27 & 29	GASOLINE FUEL INJECTION SYSTEMS. Diagnosis + Repair Shop: 1) Test & Replace: Fuel pump, injectors, relays, fuel pressure regulators. 2) Scan ECM Electronic Fuel Injection metering, fuel pressure, trouble codes…	CH. 42
Week 8 October 4 & 6	Exhaust system. Catalytic converter, EGR valve operation Shop: Diagnose/Test Catalytic converter, EGR valve testing, Diagnosis + Replace	CH. 45
Week 9 October 11 & 13	MIDTERM EXAM <Written Exam> Shop: Hands on Assignments <EXAM>	
Week 10 October 18 & 20	Turbochargers Operation and related components Shop: Diagnose + Test a turbocharger/ Remove + Replace a turbo unit/ Identify common problems	CH. 46 + Video
Week 11 October 25 & 27	Superchargers Operation and related components Shop: Diagnose common problems, testing, remove + replace a supercharger unit	CH. 46 + Video + Published Article
Week 12 November 1 & 3	AUTOMOTIVE SCANNER TYPES/ AUTOMOTIVE DATABASES AND SERVICE MANUALS Shop: Using bi-directional scanners/ Searching PRO-Demand/ Analyzing Engine data live	Videos, Published Articles
Week 13 November 8 & 10	TESTING + ANALYZING ENGINE PERFORMANCE Shop: Test, Remove & Replace, Service EGR, PCV, CKP, IAC, O_2 Sensors, TPMS, MAF, MAP Sensors/Use of Engine gas analyzer.	PRO Demand Database Service Manual
Week 14 November 15 & 17	SERVICE INFO + WORK ORDERS Shop: 1) Perform Various vehicle inspections and write the automotive technology terms. 2) Use databases for info. 3) Learn to follow diagnostic flow charts, block charts,…	CH. 7
Week 15 November 22 & 24	THANKSGIVING HOLIDAY BREAK WEEK <NO CLASSES>	
Week 16 November 29 & December 1	COURSE REVIEW OF ALL CHAPTERS Shop: Make-up Missing Shop Assignments	
Week 17 December 6 & 8	FINAL EXAM (Written) Shop: FINAL EXAM (Hands on Shop Assignments)	

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