



Basic Course Information

Semester:	SPRING 2022	Instructor Name:	Ricardo Pradis
Course Title & #:	Engine Diagnosis & Repair AUT-170	Email:	ricardo.pradis@imperial.edu
CRN #:	20429	Webpage (optional):	
Classroom:	BLDG 1100	Office #:	1100 bldg.
Class Dates:	FEB. 14 – JUN 10	Office Hours:	T-R 7:30-8:30am
Class Days:	Tuesday's & Thursday's	Office Phone #:	760-355-6403
Class Times:	Tuesday 8:00 to 10:05 Thursday 8:00 to 11:10	Emergency Contact:	760-355-6361 (Secretary)
Units:	3.0	Class Format:	Face to Face

Course Description

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

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

None

Student Learning Outcomes

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

Course Objectives

1. Learn about the automotive computer and its functions in relationship to 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 where it is applicable.
7. Learn what exhaust gas recirculation problems and the proper procedure for repair with the use of four and five gas analyzer.

Textbooks & Other Resources or Links

Textbook: G-W Modern Automotive Technology 10th Edition ISBN: 978-1-64564-4

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.

Out-of-class assignment:

Visit several automobile dealerships and gather literature on the anti-lock brake systems offered on their cars. If possible, compare the number of models that offer ABS as standard equipment. Also compare the cost of ABS system as an option from different manufacturers.

Reading and Writing assignment:

Obtain literature about automotive fuels and prepare a written report on additives and their properties. Research magazines and newspapers for information about the manufacture of alcohol for use as an automotive fuel, research and discuss modifications of engines for use of LPG as a fuel.

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 14.
 - **Final-Exam** will be given on June 7.
 - 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 participative.

Grades:

	Points
Book worksheets, quizzes.	140
Lab activity, hands-on worksheets.	240
Mid-term	60
Final-exam	60
Total points	500

Course Grade:

The course grade is based on total points accumulated during the semester. There is a total of 500 points available. Grades are determined by dividing the total points you earn by the total points available to get your percentage. (Total points may vary if I change the assignments in a particular week).

Grading of Hands-on Assignments:

The most common problem students experience is not being detailed enough in their answers and not spending the right amount of time in the repair procedures. Always be as specific as you can and use examples from your readings. Make sure to answer all parts of the questions. Points will be deducted for inadequate responses. Feedback will be given after each assignment and, hopefully, you will improve as you proceed with the course. The following grading rubric is used when grading assignments.

	Grading Rubric for Hands-on Assignment	Points
A	Focused and clearly organized. Contains critical thinking and content analysis. Convincing evidence is provided to support conclusions. Ideas are clearly communicated. Clearly meets or exceeds assignments requirements.	18-20
B	Generally focused and contain some development of ideas, may be simplistic or repetitive. Evidence is provided which supports conclusions. Meet assignments requirements.	16-17
C	May be somewhat unfocused, underdeveloped, or rumbling. But does have some coherence. Some evidence is provided which support conclusions. Meets minimum assignment requirements.	14-15
D	Unfocused, underdeveloped. Minimal evidence is used to support conclusion. Does not respond appropriately to the assignment.	12-13
F	Minimal effort by the student. Unfocused, underdeveloped. Evidence is not used to support conclusion. Block overall understanding. Does not meet assignment requirements.	0-11

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.

Safety Requirements:

For every task performed the following safety requirements must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

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 Feb. 14-19	Syllabus & Introduction (Ford Service Training) Chapter 5 Auto Shop Safety, safety test.	Pages 55-66
Week 2 Feb. 22-25	Chapter 1 The automobile Lab: Inspect automobile main systems	Pages 3-19
Week 3 Feb 28-March 4	Chapter 7 Service information and work orders Lab: Retrieve service information. (pro-on-demand)	Pages 78-86
Week 4 March 7-11	Chapter 11 Engine Fundamentals Lab: Identify major parts of an automotive engine	Pages 129-143
Week 5 March 14-18	Chapter 55 Engine Mechanical Problems Lab: Perform compression and vacuum testing	Pages 775-789
Week 6 March 21-25	Chapter 48 Cooling system testing and repair Lab: Cooling system diagnosis and testing	Pages 656-67
Week 7 March 28-April 1	Chapter 50 Lubrication system diagnosis and repair Lab: Fluid service and recycling	Pages 693-706
Week 8 April 4-8	Chapter 17 Electrical principles Lab: Define voltage, current, and resistance.	Pages 193-202
Week 9 April 11-15	MID-TERM	EXAM
Week 10 April 25-29	Chapter 21 Wiring diagrams Lab: Retrieve and read wiring diagrams. (pro-on-demand)	Pages 237-261
Week 11-12 May 2-6/9-13	Chapter 23 Computer system fundamentals Lab: Retrieve and understand data stream, inputs, and trouble codes.	Pages 279-294
Week 13 May 16-20	Chapter 25 Computer system service Lab: Retrieve output information and wiring diagrams	Pages 308-322
Week 14 May 23-27	Chapter 35 Ignition system diagnosis and repair Lab: Scanning Ignition System Problems, Spark Plugs, Ignition Timing, Coil Pack, Ignition Switch, Control Module, and Ignition System Sensors Service.	Pages 446-459
Week 15 May 31-June 3	Chapter 42 Gasoline injection diagnosis and repair Lab: Fuel System Test, Fuel Injector Problems	Pages 567-589
Week 16 June 6-10	FINAL-EXAM	EXAM

Subject to change without prior notice

Work-based Learning

Career possibilities in the automotive industry:

Work-based learning (WBL) allows student to apply classroom content in professional settings while gaining real-work experiences. These opportunities will provide you with a deeper, more engaging and relevant learning environment. Some examples of WBL assignments are job shadowing, informational interviews, and guest speakers. In this course, you will be working on workplace simulations and will be using Ford Service Training online program. It is intended to provide students with simple knowledge (basic) to complex skills (advance) training

Contact:

Office Phone: (760) 355-5721

Email: careerservicescenter@imperial.edu

Hours of Operation:

Monday - Friday; 8:00 a.m. to 5:00 p.m.