



## Basic Course Information

Semester:	<b>SPRING 2022</b>	Instructor Name:	<b>Ricardo Pradis</b>
Course Title & #:	<b>EMISSIONS CONTROL &amp; COMPUTER SYSTEMS AUT-230</b>	Email:	<b>ricardo.pradis@imperial.edu</b>
CRN #:	<b>20430</b>	Webpage (optional):	
Classroom:	<b>BLDG 1100</b>	Office #:	<b>1100 bldg.</b>
Class Dates:	<b>FEB. 14 – JUN 10</b>	Office Hours:	<b>M-W 7:30-8:00 am</b>
Class Days:	<b>Monday's &amp; Wednesday's</b>	Office Phone #:	<b>760-355-6403</b>
Class Times:	<b>M 8:00-11:10 AM W 8:00-10:05 AM</b>	Emergency Contact:	<b>760-355-6361 (Secretary)</b>
Units:	<b>3.0</b>	Class Format:	<b>Face to Face</b>

## Course Description

This is an advanced engine computer and drivability course. It emphasizes diagnostic procedure and techniques using all types of equipment and procedures. This class brings together all knowledge from AUT 160, and AUT170, and allows the students to diagnose all systems of the automobile. Upon successful completion of this course students are prepared to take the Automotive Service Excellence (ASE) certification examination in electronics, engine performance, and advance engine performance.

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

None

## Student Learning Outcomes

1. Diagnose the causes of emissions or drivability concerns with store or active diagnostic trouble codes; obtain graph, and interpret scan tool data.
2. Access and use service information to perform step-by-step diagnosis.
3. Inspect and test ignition primary and secondary circuit wiring and solid state components; perform necessary action.

## Course Objectives

1. Learn the proper safety practices of tools and equipment; learn hazardous waste policies and procedures, and learn about the air bag systems.
2. Learn about equipment used to obtain proper repair procedures using a service bulletins, computer system manuals, as well as the proper tools for each diagnosis.
3. Learn about the meters used for testing electrical circuits; learn the proper procedure for testing batteries, starters, alternators, voltage drops, and electrical drains.
4. Learn and diagnose problems with engines such as oil leaks, engine noises, overheating, compression, and vacuum problems; will also learn the proper diagnostic procedure along with the use of the proper equipment and tools.

5. Learn how to diagnose the 'no-start condition' caused by ignition systems; test and replace different components of an ignition system in the primary and secondary circuits with the aid of diagnostic equipment.
6. Learn to diagnose fuel problems that cause the 'no start condition' and drivability; will also learn the procedure for testing components for fuel systems.
7. Learn the proper methods of testing for problems in intake and exhaust systems; will learn to use a vacuum gauge, back pressure gauge, four gas analyzer, and be able to take temperature readings for the system.
8. Learn how to use four and five gas analyzers to perform emission control diagnosis; will learn how to diagnose different component in an emission system along with the use of different types of diagnostic equipment.
9. Learn how to pull up engine codes and perform scan tool operation using an engine computer, will also learn how to test engine control sensors.
10. Learn to perform a fuel pressure test, clean and replace injectors, diagnose idle problems, and learn how to perform a leakage test on a fuel injection system.
11. Learn to perform the necessary test to repair electronic carburetor controls.
12. Learn how to diagnose the 'no-start condition' on distributor type ignition systems; learn to replace a distributor, set and check timing, and describe how the timing affects the vehicle operation.
13. Learn how to diagnose the 'no-start condition' on electronic-equipped engines; learn how to replace and adjust cam and crank sensors.
14. Learn how an OBD II System works; learn how to diagnose the system using a scan tool, and learn the associated terminology of an OBD II System

### Textbooks & Other Resources or Links

Textbook: G-W Modern Automotive Technology 10<sup>th</sup> Edition ISBN: 978-1-64564-688-4

### 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.

#### ASSIGNMENTS:

Reading and Writing:

Write a report comparing the emissions produce by a late model automobile engine to the higher emissions produce by a two-stroke engines used in weed eaters, snow throwers, watercraft, etc. Discuss what can be done to reduce the emissions produce by these engines.

Out-of-class:

Monitor the pollution levels for your area (or a major metropolitan area) for one week and write a report. Note the relationship of pollution to the day's temperature and weather.

### 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 11.
- **Final-Exam** will be given on June 6.
- 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 rambling. 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
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### 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 in Automotive Emissions course 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 ( <b>Ford Service Training</b> ) Chapter 5 Auto Shop Safety, safety test.	Pages 55-66
Week 2 Feb. 22-25	Chapter 7 Service information and work orders Lab: Retrieve service information. (pro-on-demand)	Pages 78-86
Week 3 Feb 28-March 4	Chapter 17 Electrical principles Lab: Define voltage, current, and resistance.	Pages 193-202
Week 4 March 7-11	Chapter 21 Wiring diagrams Lab: Retrieve and read wiring diagrams. (pro-on-demand)	Pages 237-261
Week 5 March 14-18	Chapter 23 Computer system fundamentals Lab: Retrieve and understand data stream and trouble codes.	Pages 279-294
Week 6 March 21-25	Chapter 24 On-board diagnostics & scan tools Lab: Retrieve input information and read data stream.	Pages 294-307
Week 7 March 28-April 1	Chapter 25 Computer system service Lab: Retrieve output information and wiring diagrams	Pages 308-322
Week 8 April 4-8	Chapter 39 Automotive fuels, combustion efficiency Lab: Inspect fuel system	Pages 517-528
Week 9 April 11-15	MID-TERM	EXAM
Week 10 April 25-29	Chapter 42 Gasoline injection diagnosis and repair Lab: Fuel System Test, Fuel Injector Problems	Pages 567-589
Week 11 May 2-6	Chapter 34 Ignition system technology Lab: Identify and inspect ignition systems.	Pages 433-445



<b>Date or Week</b>	<b>Activity, Assignment, and/or Topic</b>	<b>Pages/ Due Dates/Tests</b>
Week 12 May 9-13	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 13 May 16-20	Chapter 51 Emission control systems Lab: Inspect emission components, state emissions testing programs	Pages 707-724
Week 14 May 23-27	Chapter 52 Emission control system testing, service and repair Lab: Computer Control Emission system Service, Reset Emission Maintenance Reminders, Use Exhaust Gas Analyzer	Pages 725-742
Week 15 May 31-June 3	Chapter 53 Engine performance and drivability Lab: Diagnose typical causes of engine mechanical, fuel, and electrical problems	Pages 743-755
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](mailto:careerservicescenter@imperial.edu)

### **Hours of Operation:**

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