

**IMPERIAL VALLEY  
COLLEGE  
LEARNING FOR SUCCESS**

**AUTOMOTIVE  
TECHNOLOGY**

**AUT-230**

**EMISSIONS CONTROLS  
&  
COMPUTER SYSTEMS**

**COURSE SYLLABUS**

**INSTRUCTOR:  
RICARDO PRADIS  
SPRING 2015**

**Imperial Valley College  
Industrial Technology Division  
Automotive Department**

<b>Course title:</b>	<b>Emission Controls &amp; Computer Systems AUT-230</b>
<b>Semester:</b>	<b>Spring 2015 CRN-20015</b>
<b>Location:</b>	<b>Lecture room 1100 Laboratory room 1102</b>
<b>Instructor:</b>	<b>Ricardo Pradis</b>
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<b>Secretary/division</b>	<b>(760) 355-6361</b>
<b>Coordinator</b>	<b>(760) 355-6362 (Jose Lopez)</b>

**Class Meeting:**

Monday 8:30 to 10:35 am.

Wednesday 8:30 to 11:40 am.

All students are to report to class on time defined as class schedule. Any students who arrive 15 minutes after class start time will be marked absent. You are required to report to the instructor if you will be late or must leave early or you will be mark absent for that day.

**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.

**Student Learning Outcomes (SLO)**

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

- 1.Diagnose the causes of emissions or driveability 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.

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

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 performs 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.

**Grading Criteria:**

1. Attendance: First day of class, regular attendance, and withdrawal after exceeding the number of class hours per week.
2. Tardiness: Three times equals one absent.
3. Student Conduct: Upon entry into IVC constitutes the student's acceptance of the standards of student conduct and the regulations publish by the college.
4. Each student is responsible for making up schoolwork missed because of absences.

5. 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

6. **Very important:**

- Mid-Term (60 points) will be given on April 13. It will be a multiple choice test **Bring your Scantron, and pencil.**
- Final-Exam (60 points) will be given on June 8. It will be a multiple choice test **Bring your Scantron and pencil.**
- 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 engage 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
C	Minimal effort by the student. Unfocused, underdeveloped. Evidence is not used to support conclusion. Block overall understanding. Does not meet assignment requirements.	0-11

### **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.

### **Academic Honesty**

- Plagiarism is to take and present 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 correctly 'cite a source', 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, or assisting others in using materials, which are prohibited or inappropriate in the context of the academic assignment in question. Anyone caught cheating 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 School 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
  - use of a commercial term paper

## **Automotive Technology classroom & shop policy**

### **Classroom:**

No Eating during lectures (coffee or drinks allowed). Respect your fellow student's space and property. Be on time so as to not disturb others during lectures. If you miss a class you are responsible to make up all work. Bring required material to every class session. Computers are to be used only for school related projects or assignments. No cell phones will be used during class, this include "Texting" all phones must be set to silent/vibrate and if you must take a call please leave the classroom quietly. No stereo's or music allowed in the classroom or lab area. If you are having trouble with the course and/or personal problems, communicate with the instructor as soon as possible so as to get the help needed. Students have the right to experience a positive learning environment; 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. Swearing, negative remarks and discriminatory statements will not be tolerated. If someone says anything to you that makes you feel uncomfortable or that you feel is inappropriate contact your instructor immediately. Due to college rules and state laws, no one who is not enrolled in the class may attend, including children.

### **Special Needs:**

Any student with a documented disability who may need educational accommodations should notify the instructor or the Disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S office is located in Building 2100, telephone 760-355-6312 if you feel you need to be evaluated for educational accommodations. I have made every effort to ensure that this course is accessible to all students, including students with disabilities. If you encounter any problem during this course, please contact me immediately.

### **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.
- Long hair must be kept in a ponytail or tucked away for safety.

## **Faculty and Staff**

All students are required to take direction from any faculty, any issues with direction should be brought up to your instructor, however all staff has the right to direct any student at any time. Please respect the staff's decisions.

## **Safety Requirements:**

For every task perform in Automotive Engine Technology course the following safety requirements must be strictly enforce:

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.

## **Equipment and Supplies:**

1. Textbook & Workbook: Modern Automotive Technology 7<sup>th</sup> Edition James E. Duffy
2. Pen and pencils.
3. Standard writing paper.
4. Personal Protective Equipment:
  - Safety glasses,
  - Work footwear,
  - Proper shirt and pants

## **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.

## **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.

## **Course Instructional Schedule and Learning Activities:**

**Week 1:** Class orientation, safety procedures, demonstrations, shop activities and safety test.

**Week 2:** Introduction to emissions – pollution and the environment, regulatory agencies  
Lab activity: Emission control systems identification

**Week 3:** Chapter 7: Service information & work orders

Review questions chapter 7

Workbook chapter 7

Quiz on chapter 7

Lab activity: locate and interpret vehicle VIN numbers

Access and use electronic service information (ESI)

**Week 4:** Chapter 20: Automotive Fuels

Review questions chapter 20

Workbook chapter 20

Quiz chapter 20

Lab activity: prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test and obtain exhaust readings; interpret readings, and determined necessary action.

**Week 5-6-7:** Chapter 17 & 19: Computer Systems

Review questions chapters 17-19

Workbook chapters 17-19

Quiz on chapter 17 & 19

Lab activity: Retrieve and record stored OBDI diagnostic trouble codes; clear codes.

Retrieve and record stored OBDII diagnostic trouble codes; clear codes

Inspect and test computerized engine control systems sensors, power train control module (PCM), actuators, and circuits; perform necessary action.

**Week 8: MID-TERM.**

**Week 9-10:** Onboard Diagnostic Second Generation (OBDII)

Lab Activity: Scan tool data list

Component Parameters

OBDII monitors

**Week 11-12:** Chapter 34 & 35: Ignition Systems

Review questions chapters 34-35

Workbook chapter 34-35

Quiz on chapter 34 & 35

Lab activity: Ignition system diagnosis and repair.

Inspect and test ignition primary system.

Inspect and test ignition secondary system.

**Week 13-14:** Chapters 43 & 24: Emission control systems

Review questions chapters 43-44

Workbook chapters 43-44

Quiz on chapters 43-44

Lab activity: Inspect and test computerized emissions control systems.

Inspect and test exhaust gas data, Evaporative system test, Vehicle inspection reports, drive trace reports

**Week 15:** Preparation for final exam

**Week 16: FINAL-EXAM**

**Instructor Office Hours:**

Monday:	10:35 am - 11:35 am
Tuesday	7:30 am – 8:30 am
Wednesday	1:00 pm – 2:00 pm
Thursday	1:30 pm – 2:30 pm
By Appointment:	Contact me at 355-6403 or ricardo.pradis@imperial.edu

**In Case of Emergency:**

If you have a life-threatening illness or injury that requires an ambulance, call 911 immediately. Emergency costs are not covered by Student Health Services.

Students have counseling and health services available, provided by the pre-paid Student Health Fee. We now also have a fulltime mental health counselor. For information see <http://www.imperial.edu/students/student-health-center/>. The IVC Student Health Center is located in the Health Science building in Room 2109, telephone 760-355-6310

**ASSIGNMENTS:****Reading and Writing:**

Write a report comparing the emissions produce by a late model automobile engines 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.