# IMPERIAL VALLEY COLLEGE

LEARNING FOR SUCCESS

# AUTOMOTIVE TECHNOLOGY

## AUT-160

## ENGINE PERFORMANCE TUNE-UP

## COURSE SYLLABUS


## INSTRUCTOR:
## RICARDO PRADIS


FALL 2014

# Imperial Valley College
# Industrial Technology Division
# Automotive Department

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| **Course Title:** | **AUT-160 Engine Performance Tune-Up** |
| **Semester:** | **Fall 2014 CRN10817** |
| **Class Schedule:** | **Tuesday 1:00 – 3:05 pm**<br>**Thursday 1:00 – 4:10 pm** |
| **Location:** | **Room 1100 lecture**<br>**Room 1102 laboratory** |
| **Instructor:** | **Ricardo Pradis** |
| **Phone:** | **(760) 355-6403** |
| **Email:** | **ricardo.pradis@imperial.edu** |
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| **Coordinator:** | **Jose Lopez (760) 355-6261** |
| **Secretary/Division** | **Frances Gomez (760) 355-6361** |

**Course Description:**
This course provides Operating Theory and hands-on experience in the Operation, Diagnosis and Repair of Automotive Fuel Systems with Carburetors, basic Throttle Body and Port Fuel Injection systems. Students will learn to use the Four-gas Analyzer, Engine Performance tests and Introduction to Computer Theory.

**Students Learning Outcomes:**

1. Identify and interpret engine performance concern; determined necessary action.
2. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze and frame data; clear codes when applicable.
3. Diagnose emissions or driveability concerns without store diagnostic trouble codes; determined necessary action.

**Course Objectives- Upon successful completion of this course, the student will:**

1. study and perform proper shop safety practice and learn proper handling of hazardous waste.
2. study and learn all of the emissions that are produced by the automobile, they will learn which are harmful to the atmosphere. The student will learn which emission are useful in diagnosing the vehicles for proper operation. The student will study 4 and 5 gas analyzers.
3. learn the different strokes of the engine and compression and vacuum theory. The student will perform vacuum and compressions test and learn how too much proper diagnosis from the readings they obtain. The student will learn how to figure engine size, compression ratio, and different engine designs.
4. study and learn why automobile need a proper amount of air and fuel. They will also learn what happens if this ratio is not correct.

5. study how fuel is stored and how it is moved from fuel tank to carburetion or injection system. Student will learn about Evaporative controls systems and how to test these systems and what happens if this ratio is not correct.
6. study different types of fuel pumps and filtering systems. They will also study how to diagnose these pumps and filters, and learn the necessary action to correct any problems found.
7. learn how air filter systems work and how thermostatically controlled air systems work. The student will learn how the diagnose the systems and proper procedure for repairing each systems.
8. study the theory and operation of intake and exhaust systems including catalytic converters. The student will learn proper diagnostic procedure for both systems and how to interpret the result from the diagnostic equipment.
9. learn theory and operation of Mechanical and Electronic carburetor. They will learn to overhaul procedures & troubleshooting procedure with 4 and 5 analyzers.
10. study theory of fuel injection. The student will study sensors and actuators and how to being diagnosing of each. The student will study both mechanical and electronic fuel.

**Equipment and Supplies:**

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

**Out-of-class Asignment:**

Using an automotive tool catalog, develop a list of power tools needed to equip an automotive repair shop. Find prices an add up the cost.

Reading and Writing:

Research safety literature on power equipment used in an automotive repair facility.
a) Develop a bibliography of resources for safe use of power equipment.
b) Develop a list of safety rules for their use.

**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** (60 points) will be given on October 7. It will be a multiple choice test **Bring your Scantron, and pencil.**
- **Final-Exam** (60 points) will be given on December 9. 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 | 12-13 |

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| | assignment. | |
| 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.

**Attendance:**

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity 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.
- 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.

**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 that environment can be asked to leave the class. Please refer to catalog for more information. 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.

**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 Electronics 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.

**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.

**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 or 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 more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment ;(c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment, (e) use of a commercial term paper service

**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. If you feel you need to be evaluated for educational accommodations, the DSP&S office is located in Building 2100, telephone 760-355-6313.

**Course Instructional Schedule and Learning Activities:**
**WEEK 1:**
Class orientation. Class introduction. Safety orientation, Class activities, using textbook, Homework, safety test, chapter review questions and workbook.
**For every task in the Engine Performance Tune-up class 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 disposals of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.
**WEEK 2 & 3:**
- Chapter 11: Engine Fundamentals
- Lab. Activity:
  Locate & interpret vehicle and major component identification numbers (VIN, vehicle identification levels, and calibration decals).
- Perform engine absolute manifold pressure test (vacuum).
- Perform power balance test.
- Perform cylinder compression test.

**WEEK 4 & 5:**
- Chapter 21: Fuel Tanks, Pumps, Lines, and Filters
- Lab. Activity:
- Test Mechanical Fuel Pumps
- Test Electrical Fuel pumps
- Change Fuel Filters
- Service Air Cleaners

**WEEK 6:**

- Chapter 20: Automotive Fuels
- Lab. Activity:
- Prepare 4 or 5 gas analyzer, inspect and prepared vehicle for test, and obtain exhaust readings; interpret readings and determined necessary action.

**WEEK 7:**

- Chapter 41-42: Engine Lubrication
- Lab. Activity:
- Perform oil, filter change and a 27 point inspection**.**

**WEEK 8:**

- **MID-TERM**

**WEEK 9:**

- Chapter 39-40: Cooling System
- Lab. Activity:
- Verify engine operating temperature.
- Perform cooling system test; check coolant condition; inspect and test radiator pressure cap, coolant recovery tank and hoses**.**

**WEEK 10:**

- Chapter 17-18: Computer System Fundamentals
- Lab. Activity:
- Retrieve and record stored OBD 1 diagnostic trouble codes, clear codes.
- Retrieve and record stored OBD 11 diagnostic trouble codes, clear codes.

**WEEK 11:**

- Chapter 47: Engine Tune-Up
- Lab Activity:
- Fill out a repair order
- Maintenance check

**WEEK 12 & 13:**

- Chapter 29-31-33: Electrical Systems
- Lab. Activity:
- Inspect and test battery
- Inspect and test charging system.
- Inspect and test starting system.

**WEEK 14:**

- Chapter 35: Ignition System Fundamentals
- Lab. Activity:
- Inspect and test ignition primary system wiring and components.
- Inspect and test ignition secondary system wiring and components.

**WEEK 15:**

- Preparation for Final Exam

**WEEK 16:**

- **FINAL-EXAM**

**Instructor Office Hours:**

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| **Monday:** | **10:30 am - 11:30 am** |
| **Tuesday:** | **3:05 pm – 4:05 pm** |
| **Wednesday:** | **3:05 pm – 4:05 pm** |
| **Thursday:** | **10:30 am – 11:30 am** |
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| **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 911immediately Emergency costs are not covered by Student Health Services.

**Student Counseling and 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.

**Information Literacy:**
Imperial Valley College is dedicated to help students skillfully discover, evaluate, and use information from all sources. Students can access tutorials at **http://www.imperial.edu/courses-and-programs/divisions/arts-and-letters/library-department/info-lit-tutorials/**

**Student Rights and Responsibilities:**
Students have the right to experience a positive learning environment and due process. For further information regarding student rights and responsibilities please refer to the IVC General Catalog available online at **http://www.imperial.edu/index.php?option=com_docman&task=doc_download&gid=4516&Itemid=762**