IMPERIAL VALLEY COLLEGE

LEARNING FOR SUCCESS

AUTOMOTIVE TECHNOLOGY

AUT-170

ENGINE DIAGNOSIS & REPAIR

COURSE SYLLABUS

INSTRUCTOR:
RICARDO PRADIS

SPRING 2015

IMPERIAL VALLEY COLLEGE
Industrial Technology Division
Automotive Department

Course title:	**Engine Diagnosis & Repair AUT-170**
CRN	**20013**
Instructor:	**Ricardo Pradis**
Telephone:	**(760) 355-6403**
E-mail:	**ricardo.pradis@imperial.edu**
Semester:	**Spring 2015**
Location:	**Room 1100 lecture**
	Room 1102 laboratory
Secretary:	**(760) 355-6361**
Coordinator:	**Mr. Lopez**
	(760) 355-6362

Class Meetings:

Tuesday 8:35 am to 11:45 am
Tuesday 1:00 pm to 3:05 pm

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 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.

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. 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-Upon successful completion of this course the student will be able to:

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 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.

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 14. It will be a multiple choice test **Bring your Scantron, and pencil.**
    - **Final-Exam** (60 points) will be given on June 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 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 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

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 introduction and safety orientation.
- **For every lab. Activity 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, federal safety and environmental regulations.

WEEK 2:

- Chapter 1: Introduction to automotive
- Review questions pg.160
- Workbook chapter 1
- Quiz chapter 1
- Lab Activity: identify vehicle identification number, perform safety test.

WEEK 3:

- Chapter 11: Engine Fundamentals
- Review questions pg.160
- Workbook chapter 11
- Quiz chapter 11
- Lab Activity: perform cylinder compression test, perform engine vacuum test.

WEEK 4:

- Basic Carburetion chapter 24
- Review Questions pg. 409
- Lab. Activity:
- Diagnose and test vehicles with carburetor-type fuel system; determined necessary action.

WEEK 5:

- Chapter 8 Fundamentals of Electricity
- Review Questions on page 109-110
- Quiz on chapter 8
- Lab. Activity:
- Check electrical circuits with a test light; determined necessary action.
- Locate shorts, grounds, opens and resistance problems in electrical/electronic circuits.

WEEK 6 & 7:

- Chapter 17-18 Computer system fundamentals and service
- Review Questions pgs. 259-260
- Quiz on chapter 17-18
- Lab. Activity:
- Retrieve and record stored OBD 1 and OBD 11 diagnostic trouble codes; clear codes. Obtain and interpret scan tool data.
- Use wiring diagrams during diagnosis of electrical circuits.

WEEK 8:

- **MID-TERM**

WEEK 9 & 10:

- Chapter 22-23 Fuel Injection Systems
- Review Questions pgs. 369-370/393-394
- Quiz on chapter 22-23
- Lab. Activity:
- Inspect and test fuel pressure regulation system components of injection-type fuel systems; perform necessary action
- Inspect, test, and clean fuel injector

WEEK 11 & 12:

- Chapter 43-44 Emission Controls
- Review Questions pg. 829-830/854-855
- Quiz on chapter 43-44
- Lab. Activity:
- Inspect, test, and diagnose emissions and driveability problems resulting from failure of various emission component**s**

WEEK 13 & 14:

- Chapter 34 Ignition Systems
- Review Questions pgs. 592-593
- Lab. Activity:
- Inspect and test ignition primary circuit wiring and components; perform necessary action
- Inspect and test ignition secondary circuit wiring and components; perform necessary action

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 911immediately 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:

Out-of-class:
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:
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.