

IMPERIAL VALLEY COLLEGE

INDUSTRIAL TECHNOLOGY DIVISION

AUTOMOTIVE DEPARTMENT

COURSE TITLE: Engine Diagnosis and Repair (Aut 170)

Instructors: Jose Perez / David Martinez

Classroom: 1102 and 1103

Email: Jose.perez@imperial.edu

Phone: 760 355-6362

Class begins: July 30, 2012

Class ends: Aug 25, 2012

Time: M-TH 5:30-9:30 pm

Textbook: Modern Automobile Technology by James E. Duffy

Faculty Coordinator: Jose Lopez **Ph:** 760-355-6362 **Email:** Jose.Lopez@imperial.edu

Project Coordinator: Melissa Vasquez **Ph:** 760 355-6156 **Email:** Melissa.Vasquez@imperial.edu

Development Specialist: Cecilia Garcia **Ph:** 760-355-6278 **Email:** Cecilia.Garcia@imperial.edu

Course Description:

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

Course Goal & Objectives:

Upon successful completion of this course students will be able to:

1. Apply safety procedures properly
2. Understand basic engine construction and operation
3. Employ Ohm's Law in troubleshooting electrical circuits
4. List and explain the characteristics of various fuels

5. Explain how mechanical and electrical fuel pumps operate
6. Describe different intake manifold designs
7. List the basic instruments used for electrical systems testing
8. Explain how the pressure regulator and fuel injection operate
9. Explain the purpose of each component of the exhaust system
10. Explain the function of the positive crankcase ventilation system
11. Explain how the different types of ignition systems operate
12. Explain the function and operation of various sensors and actuators
13. Explain the process of engine troubleshooting

Institutional Student Learning Outcomes (ISLO):

Student learning outcomes are written statements that represent faculty and departmental learning goals for students. After successful completion of the program or degree at IVC, students are expected to have measurable improvement in the following areas:

- ISLO 1: Communication Skills
- ISLO 2: Critical Thinking Skills
- ISLO 3: Personal Responsibility
- ISLO 4: Information Literacy
- ISLO 5: Global Awareness

Aut-170 Engine Diagnosis and Repair will provide students with learning opportunities to improve in five of the institutional learning outcomes: (ISLO 1) Communication Skills, (ISLO 2) Critical Thinking Skills, (ISLO 3) Personal Responsibility, (ISLO 4) Information Literacy, (ISLO 5) Global Awareness.

Students with Disabilities:

Any student with a documented disability who may need educational accommodations should notify his/her instructor to the Disabled Student Program and Services (DSPS) office as soon as possible. The DSPS is located in building 2117, Health Services Building, or you may contact them at 760-355-6312.

Student Responsibilities:

Each student is required to comply with the schedule established by IVC and the automotive program. Student should attend class each day classis in session. If for any reason a student is absent she/he is responsible for making up any missed work. It is recommended that students call the office to

inform the instructor if he/she is ill or bring a doctor's release note. It is also recommended for each student to bring a classroom and shop manual along with pencil and paper.

Basic Rules and Shop Safety:

1. No music allowed in the auto shop
2. No smoking in the shop area
3. No work should be redone without the instructors permission
4. No parking inside the shop during lecture time
5. No tolerance for sexual harassment
6. No long breaks (10 minutes per class hour)
7. Every student is required to wear safety glasses

Assignments and Activities consist of:

Reviews, videos, laboratory activities, service manuals, and hands-on each section

Grading System:

There will be a mid-term and a final exam. Each will be worth 25% of your grade. Quizzes will make up 25% of your grade. The last 25% of your grade will be on projects assigned as part of the lab section of the class.

Mid-term: Aug 9th

Final Exam: Aug 25th

<i>Percentage</i>	<i>Scores</i>	<i>Letter Grade</i>
25% Completed assignments	90-100%	A
25% Quizzes	80-90%	B
25% Midterm exam	70-79%	C
25% Final Exam	60-69%	D
	Less than 60%	F

(Lectures on chapters subject to change)

Week #	Objectives	Class Objectives	Homework/Exam
1	Ch 11 Engine Fundamental Reciprocating Engine Engine Components Combustion Chamber Design Engine Operation Sequence	Ch 11 Study Guide Worksheets Pgs. 145-158 Video on: Engine Four Strokes	Ch 11 Homework Summary Review and ASE questions Pgs. 159-161
1	Ch 8 Fundamentals of Electricity, Magnetism, and Electronics Insulators Conductors Volts, Resistance Amperes Ohms Law Types of Electrical circuits	Ch 8 Study Guide Worksheets Pgs. 97-108	Ch 8 Homework Summary Review and ASE questions Pgs. 109-110
1	Ch 20 Automotive fuels FUELS Combustion of gas Anti-knock qualities Fuel additives Lead free gasoline Alcohol as a fuel Diesel fuel Liquefied petroleum gas (LPG)	Ch 20 Study Guide Worksheets Pgs. 301-312	Ch 20 Homework Summary Review and ASE questions Pgs. 312-314
1	Ch 21 Fuel tanks, pumps Lines and filters Fuel supply systems Fuel supply system service Fuel delivery system diagnosis Fuel pumps Mechanical Electrical	Ch 21 Study Guide Worksheets Pgs. 315-336	Ch 21 Homework Summary Review and ASE questions Pgs. 336-338
1	Ch 22 Gasoline Injection Fundamentals Throttle Body and Multiple injection Hydraulic mechanical injection Fuel injection service	Ch 22 Study Guide Worksheets Pgs. 340-368	Ch 22 Homework Summary Review and ASE questions Pgs. 368-378
2	Ch 27 Exhaust systems Muffler Catalytic converters	Ch 27 Study Guide Worksheets Pgs. 449-467	Ch 27 Homework Summary Review and

	Super chargers Turbo chargers		ASE questions Pgs. 467-470
2	Ch 43 Emission controls Positive Crankcase Ventilation (PCV) Exhaust Gas recirculation (EGR) Secondary Air Injection (AIR) Catalytic convertor	Ch 43 Study Guide Worksheets Pgs. 803-828	Ch 43 Homework Summary Review and ASE questions Pgs. 828-830
2	Ch 34 Ignition System Fundamentals Ignition System Operation Specific Ignition Systems Breaker point Ignition System	Ch 34 Study Guide Worksheets Pgs. 567-591	Ch 34 Homework Summary Review and ASE questions Pgs. 591-594
2	Ch 35 Ignition System problems Testing and repair Spark plug service Spark plug wire service Distributor service Distributor cap and rotor service Electronic ignition distributor service Pick up coil service Hall Effect Optical Sensors Dwell Ignition Timing Adjustment	Ch 35 Study Guide Worksheets Pgs. 595-623	Ch 35 Homework Summary Review and ASE questions Pgs. 623-626
3	Ch 23 Gasoline Injection Diagnosis and Repair Fuel pressure regulator service Injector problems Throttle body injector problem Servicing EFI multiport injectors Engine Sensor Service Control Module Service Testing Idle Control Motor	Ch 23 Study Guide Worksheets Pgs. 371-391	Ch 23 Homework Summary Review and ASE questions Pgs. 392-394
3	Ch 44 Emission Control System Testing Service and Repair Computer Controlled Emission System Service Exhaust Gas Analyzer State Emissions Testing Program PCV System Service	Ch 44 Study Guide Worksheets Pgs. 831-853	Ch 44 Homework Summary Review and ASE questions Pgs. 854-855

	Evaporative Emissions System Service Thermostatic Air Cleaner System Service EGR System Service Air Injection System Service Pulls Air System Service Catalytic Converter Service OBD II Drive cycle		
3	Ch 17, 18, 19 Computer System Fundamentals Computer control system Components of a computer control system Electronic control module Operation: sensor actuators	Ch 17, 18, 19 Study Guide Worksheets Pgs. 235-294	Ch 17, 18, 19 Homework Summary Review and ASE questions Ch 17 Pgs. 158-260 Ch 18 Pgs. 278-281 Ch 19 Pgs. 295-297
4	Ch 45 Engine Performance and Driveability Engine performance problems Typical performance Problems Engine Performance Diagnosis	Ch 45 Study Guide Worksheets Pgs. 859-866	Ch 45 Homework Summary Review and ASE questions Pgs. 866-869
4	ASE Preparation Final Exam		