IMPERIAL VALLEY COLLEGE


| Basic Course Information | | | |
|---|---|---|---|
| Semester: | Spring 25 | Instructor Name: | Pat Barbee |
| Course Title & #: | AUT 245 Hydraulic & Pneumatic Systems | Email: | |
| CRN | 20907 | Webpage (optional): | |
| Classroom: | 1602 | Office #: | 1104 A |
| Class Dates: | February 10th — June 6th | Office Hours: | 4:00 to 6:00 |
| Class Days: | Tuesday / Thursday | Office Phone #: | |
| Class Times: | **8:15-12:40pm** | Emergency Contact: | Tisha Nelson — Staff Support Technician (760) 355-6361 |
| Units: | 4.0 | Class Format: | Face to Face |

## Course Description

This course covers the theory of fluid power, system design, troubleshooting, and repair of both hydraulic and pneumatic systems. Covers fundamental hydraulic and pneumatic schematics and circuits, including the function of components such as, pumps, valves, cylinders, motors, reservoirs, actuators, convertors, fluid conductors, and valves. Hands-on lab activities will be provided with equipment and devices used in the heavy equipment and agriculture industry. (CSU)

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

AUT 140 with a grade of "C" or better.

## Student Learning Outcomes

1. Describe the difference between operating pressures of pneumatic and hydraulic systems.
2. Identify the steps and procedures to perform an inspection on a hydraulic and pneumatic system.
3. Remove inspect and re-install different types of pumps and actuators.

4. Test, service and analyze circuits for pressure flow for hydraulic and pneumatic systems.

## Course Objectives

1. Define fluid and pneumatic power systems.
2 Identify process flow on a hydraulic and pneumatic schematic and interpret fluid power symbols on a fluid power circuit drawing.
3 Troubleshoot hydraulic and pneumatic pumps and valves.
4 Select appropriate actuators for a particular application and inspect and replace piston, and vane cylinders. 5 Select proper replacement components per manufacturer's specifications .6 Trouble shoot and replace gear, vane, and piston motors.
7. Apply the operating principles of general hydraulics to repair, maintain, install and analyze a variety of hydraulic and pneumatic components.
8. Analyze and repair hydrostatic drives, charge pumps, valves and pistons and rear end drives.
9 Analyze and repair pneumatic, weight-loaded, and spring-loaded accumulators.
10 Analyze and repair reservoirs, oil coolers, hoses pipes, tubes and couplers.
11 Diagnosis and testing of hydraulic systems.
12. Troubleshoot and replace hydraulic and pneumatic seals.

## Other Resources or Links

## Textbooks &

Fluid Power Hydraulic and Pneumatics 3rd Edition by James R. Daines/Martha J. Daines Goodheart-Wilcox ISBN' 9781635634730

AMATROL Curriculum for Fluid Power

Access to computer, Internet, and word type applications.

Pen and pencils

Standard writing paper and notebook.

Lab days will require: Safety glasses, work footwear (no open toe shoes, slip resistant), proper shirts and pants.

## Course Requirements and Instructional Methods

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This course will consist of a variety of instructional methods and assignments including, but not limited to, audio visual aids, lectures, class discussions, lab activities, field trips, and demonstrations.

## Course Grading Based on Course Objectives

Grading System:

A — 513-570 of points =

Excellent B — 456-512 of points

= Good

C — 399-455 of points = Acceptable

D — 342-398 of points = Below Average

F — 341 points and below = Failing

| Activities | Points |
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|---|---|
| Homework & Quizzes | 80 |
| Labs | 150 |
| Final Exam | 340 |
| Total Points | 570 |

***There are no make-up exams unless arrangements with the instructor are made prior to exam.

## Course Policies

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink: Food and drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: 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.
- Children in the classroom: Due to college rules and state laws, only students enrolled in the class may attend; children are not allowed.

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property. There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct. Plagiarism is taking and presenting 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 cite a source correctly, 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 that are prohibited or inappropriate in the context of the academic assignment in question. Anyone caught cheating or plagiarizing will receive a zero (O) 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 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 • using a commercial term paper service.

Attendance: 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.

## Other Course Information

Shop/Lab Area Safety

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's responsibility (students not wearing safety glasses will be asked to leave lab for that day, no exceptions) .Clean up your area and any other lose debris, trash, or spills.
Wear all required safety protection and comply with posted signs.
No shorts or open toe footwear, always be prepared for lab exercises.
Comply with tool check out policy and clean tools before returning.
Damaged or missing tools must be reported immediately. Tools are the students' responsibility.
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.
Jewelry such as rings and necklaces must be put away or tucked in for safety.

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- Lab work will cease 20 minutes prior to end of class to allow time for cleaning areas and returning tools.

Projects

- All projects must be approved by instructor and require a written work order.
- All projects must be removed from campus prior to finals.
- Projects are taken with students at end of class unless approved by instructor.

In addition to standard course curriculum, portions of this course will prepare you for ASE certifications.

## IVC Student Resources

### 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 I | Syllabus and Safety Test . Introduction to Pneumatic Systems | Amatrol Online |
| Week 2 | Amatrol Pnuematics 1 | Amatrol Online |
| Week 3 | Amatrol Pnuematics 1 | Amatrol Online |
| Week 4 | Amatrol Pneumatics 1 | Amatrol Online |
| Week 5 | Amatrol Pneumatics 2 | Amatrol Online |
| Week 6 | Amatrol Pneumatics 2 | Amatrol Online |
| Week 7 | Amatrol Pneumatic Silver & Gold Certification | Amatrol Online |
| Week 8 | Amatrol Hydraulic Industrial Safety | Amatrol Online |
| NO SCHOOL | | |
| Week 9 | Amatrol Hydraulic System 1 | Amatrol Online |
| Week 10 | Amatrol Hydraulic System 1 | Amatrol Onlone |
| Week 11 | Amatrol Hydraulic System 1 | Amatrol Online |
| Week 12 | Amatrol Hydraulic System 2 | Amatrol Online |
| Week 13 | Amatrol Hydraulic System 2 & Hydraulic Silver Certification | Amatrol Online |

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| Week 14 | Actuators. Controlling the System and Filter System Maintenance. | Chapters 9 , 10 and 12 |
| Date or Week | Activity, Assignment, and/or Topic | Pages/ Due Dates/Tests |
| | | |
| Week 15 | Applying Hydraulic Power | Chapter 13. Pages 338 to 354 |
| Week 16 | Final Exam | |

** *Subject to change without prior notice* **