ISET-1320: FUNDAMENTALS OF FLUID POWER

Cuyahoga Community College

Viewing: ISET-1320 : Fundamentals of Fluid Power

Board of Trustees:
2006-05-25

Academic Term:
Fall 2018

Subject Code
ISET - Integrated Systems Engineering

Course Number:
1320

Title:
Fundamentals of Fluid Power

Catalog Description:
Principles of power transmission are presented and contrasted with other means of transmission. Includes laws and principles of fluid power transmission, units of pressure and flow, plumbing materials and sizing, pressure losses through piping, and the uses of vacuum and vacuum applications. Extensive guided instruction and practice provided.

Credit Hour(s):
2

Lecture Hour(s):
1

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
ISET-1300 Mechanical/Electrical Print Reading.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms/. Blackboard accessibility information is available at http://access.blackboard.com.

Eastern (216) 987-2052 - Voice
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts.

Therefore, attendance is recorded in the following ways:

- For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.
- For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return.

Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called 'artifacts,' for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdf You must also comply with the College’s Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes

Course Outcome(s):
A. Install, maintain repair hydraulic and pneumatic systems.

Objective(s):
1. Apply hydraulic power principles.
2. Identify types of valves.
3. Interpret schematic, symbols, and drawings.
4. Apply circuit design.
5. Identify and apply pressure relief valves.
6. Recognize and apply 3 way, 4 way, and 5 way valves.
7. Calculate volume and pressure.
8. Apply Pascal and Bernoulli’s laws defining fluid and pneumatic power.
10. Identify proper plumbing materials.
11. Identify fluid power cylinders.
12. Identify proper cylinder applications.
13. Calculate cylinder size for pressure applications.
14. Recognize and apply control valves.

Course Outcome(s):
C. Select appropriate hydraulic fluids for various applications.

Objective(s):
1. Identify types of fluides that are flammable or not.
2. Apply petroleum base fluids.
3. Apply bio-degradable
4. Identify synthetic fluids.
5. Identify contaminates and repercussions from contaminates.

Course Outcome(s):
D. Select, install and repair pump for fluid systems.

Objective(s):
1. Calculate air compressors load (power calculation)
2. Recognize displacement pumps.
3. Identify proper pump applications.
4. Explain mounting, alignment, and coupling.
5. Apply filtering components to circuits.

Course Outcome(s):
E. Apply troubleshooting procedures.

Objective(s):
1. Interpret control circuit diagrams.
2. Identify improper pump operations (rotation, cavitations, unloading).
3. Recognize and test for pump and circuitry leakage.

Course Outcome(s):
F. Comply with OSHA safety standards for installing, maintaining, and repairing hydraulic pneumatic systems.

Objective(s):
1. Employ lock-out/tag-out.
2. Identify safety procedures.

Methods of Evaluation:
1. Completion of homework assignment.
2. Written quizzes covering homework and in class demonstrations.
3. Class discussion participation.
4. Demonstration of application of theories and methods.
5. Final exam.

Course Content Outline:
1. CONCEPTS
   a. Safe operating procedures
   b. Pascal’s Law
c. Bernoulli Law  
d. Characteristics of fluid  
e. Fluid power principles  
f. Electric motors  
g. Control circuits (electric, fluid, and air)  
h. Cylinder types and applications for fluid and air  
i. Valve types and applications  
j. Pump types and applications  
k. Pump nomenclature  
l. Hydraulic circuits  
m. Flowcharts  
n. Plumbing materials and applications  
o. Hand Tools  
p. Mechanical drives  
q. Pump impellers  
r. Instrumentation  
s. Installations  
t. Troubleshooting  
u. Print reading  

2. SKILLS  
a. Safe handling of hydraulic fluids  
b. Create troubleshooting Flowchart  
c. Install, test, repair piping systems  
d. Mount and align pumps  
e. Calculate cylinder size and pressure  
f. Calculate compressor loads  
g. Interpret fluid systems drawings and schematics  
h. Troubleshooting (fundamentals)  
i. Reliability Centered Maintenance Applications  
j. Component applications  
k. Customer Service  

3. ISSUES  
a. Relate theory to practical applications  
b. Identifying quality manufactures  
c. Industry Networking  
d. Communication  
e. Reading control circuit diagrams  

Resources  

Resources Other  
1. Amatrol Software  

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