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Iowa Lakes Community College is committed to ensuring that all programs and services, including electronic and our website (www.iowalakes.edu), are accessible to people with disabilities. In accordance with the provisions of Sections 504 and 508 of the Rehabilitation Act and the Americans with Disabilities Act (ADA), Iowa Lakes provides students, faculty, staff, and visitors with reasonable accommodations to ensure equal access to the programs and activities of the college. For more information visit: https://www.iowalakes.edu/educational-counseling-services/accommodations-disability-resources.

Chad Tischer is Engineering Technology Program Coordinator at Iowa Lakes Community College.

Updated in 2017, this course covers an introduction to fluid power control and is offered in credit programs in a face-to-face format.

Course Syllabus

EGT 137 - Fluid Power Control

Class Day/Time
Spring/2018

Iowa Lakes Community College
300 South 18th Street
Estherville, IA 51334

Instructor Name: Chad Tischer
Office No: 315
Office Phone: (712)-362-8366 Cell Phone: (712) 209-6297
Email: ctischer@iowalakes.edu
Office Hours: As posted on office door

Catalog Description:

This course covers maintenance and troubleshooting fluid power electrical controls such as relay logic, programmable controls and servo controls. Troubleshooting and maintenance of servo

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valves and proportional control valves as well as other fluid power components are covered. Logical control sequences are presented to instruct the student on the concepts used in industrial controls automation.

Prerequisites:
EGT 117 – Fluid Power Fundamentals
ELT 125 – Advanced PLC

Credits: 4 (2 Lecture, 2 Lab)

Text & Additional Materials:
TBA

Course Objectives/Competencies:

Upon successful completion of the course, a student should be able to:

- Identify types of electrical solenoid valves by their appearance, port connections and how they operate.
- Describe the proper application, wiring, operation and setting of mechanical switching control devices.
- Identify the type of switch contacts from their drawing symbols.
- List the main component parts and explain the operation of a relay or contactor.
- Describe the proper application, wiring, operation and setting of electronic control devices such as proximity, pressure and flow switches.
- Identify common electrical control components from their symbols on a drawing.
- Describe the general layout and features of a ladder diagram.
- Follow wiring through a wiring diagram and describe the difference between a wiring diagram and ladder.
- Follow a circuit through a ladder diagram and be able to describe the sequence of events.
- Interpret a sequence of events diagram and be able to describe when devices are activated.
- Explain how to accomplish automatic cylinder cycling with travel limit switches.
- Describe how pressure switches can be used to control cylinder operation.
- Describe how wire control devices can be used to operate solenoids for cylinder control.
- Describe how to use electrical solenoids for system unloading.
- Explain how to accomplish automatic cylinder sequencing with travel limit switches.
- Describe how pressure switches can be used to control cylinder sequencing.
- Wire control devices to operate solenoids for cylinder control.
- Use timers to control the sequential operation of a cylinder control.

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- Explain how to accomplish automatic cylinder cycling with travel limit switches.
- Describe how pressure switches can be used to control cylinder operation.
- Describe how wire control devices can be used to operate solenoids for cylinder control.
- Describe how to use electrical solenoids for system unloading.
- Explain how to accomplish automatic cylinder sequencing with travel limit switches.
- Describe how pressure switches can be used to control cylinder sequencing.
- Wire control devices to operate solenoids for cylinder control.
- Use timers to control the sequential operation of a cylinder control.
- Explain how to electrically control pressure relief settings work.
- Discuss step level pressure control.
- Wire solenoids and switches to implement remote pressure control.
- Diagnose problems with the starting signal for a fluid power sequence.
- Explain how to use timers to help in resolving cycle problems in fluid power circuits.
- Place limit switches and cams to provide correct cycle.
- Explain the operation of a rotary cam switch in a control circuit.
- Discuss the purpose and operation of a cylinder dwell circuit.
- Sketch a ladder diagram to control a hydraulic or pneumatic drilling operation.
- Discuss the pros and cons about methods of cylinder indexing.
- Add a counter to control a stack operation.
- Discuss the controls needed to perform an indexing or part turn over operation.
- Explain the operation of electrical cylinder deceleration.
- Explain the reason for and operation of two hand safety circuits.
- Discuss the reason and methods for wiring anti-tie down circuits.
- Wire panic buttons into hydraulic circuits for safety.
- Discuss the general concept of fail-safe mode of design.
- Explain how and where warning sensors are placed in fluid power control circuits.
- Discuss the reasons for pump unloading during motor startup.
- Discuss how servo valves are selected.
- Explain the construction and general operation of a servo valve.
- Contrast the operation and makeup of a proportional valve.
- Sketch the block diagram of an electro-pneumatic servo system.
- Explain the purpose of the components of an electro-pneumatic servo system.
- Discuss the typical pressure drops in servo and proportional valves.
- Sketch typical servo valve connections.
- Discuss features of servo amplifiers.

Methods of Instruction:
Course will consist of a two hour lecture each week, which may include reviewing assignments, discussion, demonstrations and other methods to be determined by the instructor. Two hours of

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lab meeting twice each week will follow the lecture and will cover material discussed that week.

Grading Policies:

Scale: **A** = 90.00 – 100%
B = 80.00 – 89.99%
C = 70.00 – 79.99%
D = 60.00 – 69.99%
F = 00.00 – 59.99%

Other Expectations: The instructor will determine the weight of each assessment towards overall points. Graded components are as follows:

- Assignments 200 points
- Labs 250 points
- Tests, quizzes and midterm 300 points
- Final Exam 150 points

Points may vary, this outline should only be used as an estimate.

Students are expected to attend all classes and labs.
Students unable to attend a lecture or exam must notify the instructor by e-mail before the absence.
Students who are absent and have notified the instructor will be allowed to reschedule tests or assignment.
Students who are absent and have not notified the instructor will not receive credit on any test or assignment due that day.
Students are responsible for learning the course material covered during their absence.
The instructor will not notify students individually if assignments or deadlines are missed.
Each exam will be announced at least one classes in advance.
Students who leave the room while a test is in progress must submit their exam as completed.
The final is comprehensive and will be administered during finals week.
Students must have achieved a grade of "D" or higher to be eligible for the final exam.
Students are expected to conduct themselves in a professional manner.
Classes and labs will start promptly. If you are unprepared do not enter the classroom.
All communications must be conducted through the iowalakes.edu e-mail address.
Any behavior which is disruptive or unsafe may be grounds for removal from class.
Cell phone use and texting are prohibited in lecture.
Cell phone use and texting are prohibited in lab, unless instructed otherwise.
The use of a cell phone will result in a zero for anything done on that day. Only one warning will be given.

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Students who need to leave class early should let the instructor know before class begins and leave quietly.
Avoid prolonged noise, especially during class discussions.
Incompletes are only issued when the student can establish a completion date.
Drug and alcohol use is prohibited.
Students suspected of being under the influence of drugs or alcohol will be asked to leave.

Important: NO food or drinks in the lab

Students must abide by all policies as stated in the Iowa Lakes Community College Student Handbook.

Students should be aware that classes might be audio or video recorded by one or more students. The college's policies governing the audio or video recording of class are included in the Student Handbook. Students who have any questions or concerns about class recordings should address their questions or concerns with the instructor at the ***beginning of the semester***.

STUDENT ACADEMIC HONESTY POLICY

Iowa Lakes Community College believes that personal integrity and academic honesty are fundamental to scholarship. Iowa Lakes strives to create an environment where the dignity of each person is recognized and an atmosphere of mutual trust exists between instructors and students. The faculty has confidence in the integrity of the students and encourages students to exercise good judgment in fulfilling this responsibility.

Actions contrary to academic integrity will not be tolerated. Activities that have the effect or intention of interfering with learning or fair evaluation of a student's work or performance are considered a breach of academic integrity. Examples of such unacceptable activities include, but are not limited to:

- **Cheating** (intentionally using or attempting to use unauthorized material, assistance or study aids in my academic work). For example, using a cheat sheet for a test, looking at another student's paper during an exam, stealing or buying all or parts of an exam or paper, altering and resubmitting work for a better grade without prior approval to do so, etc.
- **Plagiarism** (representing another's ideas, words, expressions or data in writing or presentation without giving proper credit, failing to cite a reference or failing to use proper documentation, using works of another gained over the Internet and submitted as one's own work).
- **Falsification and/or misrepresentation of data** (submitting contrived or made-up information in any academic exercise). For example, making up data, citing non-existent sources, etc.
- **Facilitating Academic Dishonesty** (knowingly helping or attempting to help another violate any provision of the academic honesty policy). For example, working together on a take-home exam or other assignment when the option has not been made available, giving a paper/assignment to another student for his/her use, etc.
- **Multiple Submissions** (submitting, without prior approval from the instructor involved, any work submitted to fulfill academic requirements in another class). For example, submitting the same paper for two different classes, etc.
- **Unfair Advantage** (trying to gain unauthorized advantage over fellow students). For example, gaining or facilitating unauthorized access to exam materials (past or present); interfering with another student's efforts in an academic exercise;

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lying about the need for an extension on a paper or assignment; destroying, hiding, removing or keeping library materials, etc.

Disciplinary Action

Any violation of this policy will be treated as a serious matter. The instructor has primary responsibility over classroom behavior and maintaining academic integrity. Students who earn an "F" based on any violation of the Student Academic Honesty Policy may not withdraw from the class (and receive a grade of W). Depending on the nature and severity of the offense, Iowa Lakes Community College reserves the right to exercise disciplinary action as outlined in the Disciplinary Action Section of the Student Handbook.

Americans with Disabilities Act – Policy of Nondiscrimination

It is Iowa Lakes Community College policy to not discriminate against qualified individuals with disabilities and to provide reasonable accommodation(s), as required by law, to otherwise qualified applicants for admission or to students with disabilities in all education programs, activities, services and practices, including application procedures, admissions, course selection, the awarding of degrees, discipline and dismissal. Educational opportunities will not be denied to an otherwise qualified application or student because of the need to make reasonable accommodation(s) or modification(s) for the physical and mental impairment(s) of any such individual.

Iowa Lakes Community College students needing reasonable accommodation(s) and/or modification(s) should contact Jody Condon by phone at (712) 852-5219 or via email at jcondon@iowalakes.edu. To assure that accommodation(s) and/or modification(s) will be ready when classes start, students must make the request as soon as possible, before a semester begins.

It is the policy of Iowa Lakes Community College not to discriminate on the basis of sex, race, national origin, creed, age, marital status or disability in its education programs, activities, or employment policies, as required by Titles VI and VII of the 1964 Civil Rights Act, Title IX of the 1972 Educational Amendments, Section 504 of the Federal Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act (ADA) of 1990.

Inquiries regarding compliance with Title IX, Title VI, Title VII, or Section 504 may be directed to Kathy Muller, Human Resources, Iowa Lakes Community College, 19 S. Seventh Street, Estherville, IA 51334, telephone (712) 362-0433; to the Director of the Iowa Civil Rights Commission, Des Moines; or to the Director of the Region VII Office of Civil Rights, Department of Education, Kansas City, Missouri.

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