

**Oklahoma State University Institute of Technology**  
**Face-to-Face Common Syllabus**  
Fall 2017

**ACR 2443 System Controls**

Topics include the operation, calibration, and servicing of equipment with direct digital control systems. Systems with both dedicated and programmable controls are covered. Special emphasis is placed on checking inputs and outputs to individual control systems.

**Course Purpose:**

Give learners a foundation in Direct Digital Controls and an introduction to Energy Management.

**Type of Course:** Theory/Lab

**Credit Hours:** 3; Total clock hours of theory per semester: 30;

Total clock hours of lab per semester: 45.

**Class Length:** 1<sup>st</sup> Half

**Class Days and Times:** M-F 7:30 – 9:25

**Prerequisites:** ACR 1343

**Instructor Name:** Chris Lamm

**Instructor Phone:** (918) 293-5312

**Office:** Bldg. 315 Room #114B

**Instructor Email:** [chris.lamm@okstate.edu](mailto:chris.lamm@okstate.edu)

**Contact:** My preferred method of contact is e-mail. Please allow 24-48 hours to return your correspondence during the normal work week.

**Instructor's Office Hours:** MWF 9:30 – 11:30; other times available by appointment.

**School Name:** Construction Technologies

**School Main Phone:** 918-293-5304

**REQUIRED TEXT, REFERENCES, AND MATERIALS**

**Texts:** N/A

**References:** Refrigeration and Air Conditioning Technology 8<sup>th</sup> Edition \$142.80

ISBN# 978-1-305-57829-6 (Same as program text)

**Materials:** Notebook, lead pencils, colored pencils, calculator, USB storage device.

**Uniform/Tools:** Pocket screwdriver plus volt meter (tools used in prerequisites).

**Estimated Cost for Materials:** \$ 40

**Estimated Cost for Uniform/Tools:** \$ N/A

**Optional Resources:** N/A

**Upon completion of the course, students should:**

<b>Course Objectives</b>	<b>Assessment of Objectives</b>
Select different types of input devices, and use a variety of output devices that are common to direct digital controls.	Unit exams, homework assignments, Lab projects
Should be capable of doing basic troubleshooting on direct digital controls	Unit exams, homework assignments, Lab projects
Set addresses and baud rates on controls	Unit exams, homework assignments, Lab projects
Build points for input devices.	Unit exams, homework assignments, Lab projects
Wire different types of input devices.	Unit exams, homework assignments, Lab projects
Wire and check out various types of actuators.	Unit exams, homework assignments, Lab projects
Wire up heating and cooling systems.	Unit exams, homework assignments, Lab projects
Use a time scheduling program.	Unit exams, homework assignments, Lab projects
Set up a variable air volume control.	Unit exams, homework assignments, Lab projects
Set up and change variables on a variable frequency drive motor.	Unit exams, homework assignments, Lab projects

Aspects of the course objective assessments may be used in the university's assessment of student learning. If applicable, an asterisk (\*) above indicates this assignment is used in the university assessment program.

**COURSE ACTIVITIES**

In this course students will:

- Participate in class discussions and activities.
- View videos and slide shows that depict the various concepts.
- Utilize open (free) resources on the World-Wide Web.
- Wire high and low voltage controls.
- Apply basic mathematic skills.
- Take examinations.
- Complete reading assignments.
- May be required to do quizzes.

**EVALUATION - GRADES WILL BE BASED ON THE QUALITY AND COMPLETION OF THESE TASKS:**

Lab Assignments/Exams	75%
Written Exams	25%
<b><u>Total</u></b>	<b><u>100%</u></b>

<b>OSUIT Grading Scale</b>
A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% & below

\*The student's grade for this assignment will be used in the university's assessment of student learning. A 70% competency or higher receives a Pass rating. This Pass/Fail rating is independent of the student's course grade.

Daily and/or weekly quizzes, small weekly assignments and similar type projects: Normal return time to student by next class meeting or no later than one (1) week.

Extensive assignments, large lab projects, extensive quizzes, exams and similar type projects: Normal return time to students in one (1) to two (2) weeks.

**RECOMMENDED STUDENT COMPETENCIES/SKILLS**

Basic working knowledge of the Windows operating system.

Basic mathematical knowledge (Add, Subtract, Multiply, Divide fractions and whole numbers).

**AUTHORIZED TOOLS**

Students may use any/all course materials, including books and notes, while participating in Lab projects. All quizzes and written assignments are to be completed independently; no collaboration with classmates is permitted and any instance of such will be considered academic dishonesty.

**LATE WORK**

A student must be present to receive their assignment, and all assignments are due within the first five (5) minutes of class on the next class day. Homework that is not turned in at the proper time is considered late. Late homework will be accepted but 20% will be taken off your assignment grade for each day it is late up to 5 days.

**TESTING**

All students should be present on test day. Ten percent will be taken off per day that a person is late for taking a test. Cell phones cannot be used when taking a test. Calculators can be used when taking a test.

**OTHER LAB AND CLASSROOM POLICIES**

The Systems Controls lab is equipped with sensitive electronic equipment and students should take care when assembling, wiring, or manipulating this equipment for any project. Food item will not be allowed. Sealed (cap or lid) drink containers may be allowed.

## **SYLLABUS ATTACHMENT**

View the Syllabus Attachment, which contains other important information, by visiting [http://osuit.edu/center/student\\_syllabus\\_information](http://osuit.edu/center/student_syllabus_information)

<b>Course Schedule</b>			
<b>Day/Week</b>	<b>Topic</b>	<b>Assignment Description</b>	<b>Assessment</b>
Day3/Week 1	Orientation	To receive instruction on department and instructors requirements concerning dress, grading criteria, and attendance in addition to safety requirements to be observed.	
Day4/Week 1- Day5/Week1	Introduction to DDC controls	To look at basic automatic controls as it applies to direct digital control systems.	Written Exam
Day1/Week2	System Architecture	To help the student understand a basic LAN and SubLAN system.	Written Exam
Day1/Week 2	System Addresses	To help the student understand how individual points in a system are identified.	Written Exam
Day2/Week 2	Setting up the 7716 PCU	To learn to set up control applications, baud rates and addresses on the 7716 PCU.	Written Exam
Day3/Week 2	The universal input circuit	To show the students how different types of inputs can be used with controls, and how to build the input points.	Written Exam
Day4/Week 2	Output points	To help the students understand how output points are addressed and the capabilities of these different outputs.	Written Exam
Day5/Week 2	Loading Programs	To learn how to load a program into the computer and in the controllers, and use program modules	Written Exam
Day1/Week 3- Day3/Week 3	Time Scheduling	To learn to use time scheduling to turn heating and cooling on and off.	Written Exam
Day4/Week 3- Day5/Week 3	2-pos module & fan status	To use the 2-position module in our program and to use a fan status control.	Written Exam
Day1/Week 4- Day5/Week 5	PWM, VDC and Milli-amp actuators	To help the student understand what a PWM, VDC, and ma actuator is, and how they are used with a proportional module.	Written Exam
Day1/Week 6- Day5/Week 7	Variable Frequency Drive Motors	To wire and program variable frequency drive motors. To look at applications where these motors will be used in our industry.	Written Exam

Schedule is subject to change at instructor discretion.