

ELE 239

Programmable Controllers

Course Outline

Revised: Spring 2015

Prerequisites:

Prerequisite: ELE 226 and ETR 280 or ELE 133 and ETR 141, or department approval.

Course Description:

Course Description: Deals with the installation, programming, interfacing and concepts of troubleshooting

Note: This course will require a group-based project, possibly necessitating out-of-class group work sessions. Group projects will be presented to the class. Individual project grades will be based on peer as well as instructor evaluations. Group members will not necessarily receive the same grade on the project. Hybrid class participants will have the option of electronically submitting a presentation or presenting it in person the last week of class.

programmable logic controllers. Emphasis will be on the Allen-Bradley Micrologix 1000-1500 PLCs and Rockwell RSLogix 500 software. A group project will be required for this class. Students taking the hybrid section of this class will view the lecture portion of the class via streaming video over the Internet and use a software simulator and submit laboratory exercises electronically

Semester Credits: 3

Lecture Hours: 2

Lab/Recitation Hours: 2

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Course Outcomes

At the end of the semester, the student will be able to:

1. Identify the parts of a programmable controller.
2. Develop ladder logic programs from ladder schematic diagrams.
3. Develop ladder logic programs to meet specific control criteria.
4. Use ladder logic design software.
5. Install programmable logic controllers and interface them to real-world devices.
6. Debug/troubleshoot PLC programs and systems.
7. Demonstrate proficiency and teamwork skills in the laboratory.

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Required Materials:

Software: RSLogix 500 software will be used for this class. There is also a “lite” version of this software and a simulator available for use at home that can be downloaded.

Software for Hybrid Class: LogixPro® 500 simulation and project software. Available at:
<http://thelearningpit.com/lp/logixpro.html>

Equipment: Safety Glasses will be required when operating electrical or mechanical equipment.

Textbook:

Technician’s Guide to Programmable Controllers 6th Edition, Richard A. Cox and Terry Borden,
© 2013, 2007, Cengage Learning. ISBN 9781111544096

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Topical Description:

Course Outline (Dates and topics subject to change):

<u>Class</u>	<u>Topic</u>	<u>Text Reference</u>
Week 1	<ol style="list-style-type: none"> 1. Rules, Policies, Evacuation, etc. 2. PLC Overview 3. Input/Output–Types and Limitations 4. Installation and Safety Considerations 5. Hardware and Programming Devices 6. Homework–Read text Chapters 1-4 7. Lab–None 	Chapters 1-4
Week 2	<ol style="list-style-type: none"> 1. Review of Ladder Diagrams and Digital Control Logic 2. Basic Relay Instruction Programming 3. Homework–Review Chapters 6 and 7 and Answer Review Questions. 4. Lab–Three-Wire Control Circuit and Basic PLC interfacing. <p><i>Note: Most of the information contained in Chapters 6 and 7 has been covered in previous courses and will not be covered in detail. Carefully review this material and ask questions as necessary. It will be assumed that you understand this material in future assignments in this class.</i></p>	Chapters 6 and 7
Week 3	<ol style="list-style-type: none"> 1. A-B MicroLogix 1000 and 1500 Memory Organization and Addressing and File Structure. 2. Basic Relay Instruction Programming. 3. Homework–Read Chapters and Answer Review Questions. 4. Lab–Introduction to RS Logix Software and Basic Relay Instruction Programming. 	Chapters 5, 8 and 9
Week 4	<ol style="list-style-type: none"> 1. Test #1. 2. PLC Programming and Control Considerations. 3. Input and Output Specifications and Interfacing. 4. Lab–Various Projects. 	Chapters 10-11
Week 5 2/7	<ol style="list-style-type: none"> 1. Programming Timers 	Chapter 12

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	2. Lab-Timers	
Week 6	1. Programming Counters 2. Lab-Counters	Chapter 13
Week 7	1. Sequence Operations 2. Lab-Sequencers	Chapter 17
Week 8	1. Test #2 2. Data Manipulations 3. Math Functions 4. Lab-Math Functions	Chapters 14-15
Week 9	1. File Management 2. Presentation of Final Project Requirements and team assignments. 3. Final Project Description Due	Chapter 16
Week 10	1. Analog Signals and Process Control 2. Complete Lab Projects 3. Final Project Description Due	Chapter 18
Weeks 11-15	Various Lab Project Assignments an/or Work on Final Project	
Week 16	Presentation of Projects	

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