

**MIAMI UNIVERSITY
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF ENGINEERING TECHNOLOGY**

ENT – 296	Programmable Logic Controllers	3
Course Number	Title	Credit hours

DESCRIPTION:

Study of the principles and application of Programmable Logic Controllers including ladder logic, program control, data manipulation, math instructions, sequencers, shift registers, networking, PLC-mechanism interfacing and human-machine interfacing.

PREREQUISITES: ENT 291 Industrial Electronics

TEXT MATERIAL:

Petruzella, Frank D., Programmable Logic Controllers, McGraw Hill, Third Edition, 2005
Petruzella, Frank D., Lab Manual for Programmable Logic Controllers, McGraw Hill, Third Edition, 2005

COURSE OBJECTIVE: The student will develop an understanding of the operation and application of Programmable Logic Controllers. Specifically students will be able to do:

- Write PLC programs to solve complex control situations
- Connect a PLC to the web and monitor and control a process over the web
- Demonstrate competency in HMI programming

OUTCOMES: This course addresses the following outcomes planned for ECET program.

- Knowledge of electrical/computer engineering safety
- The ability to setup and analyze industrial local area networks
- The ability to conduct experiments, obtain data and make improvements in designs
- The ability to transfer data from a PLC using HMI Programming
- Effective teamwork skills
- A commitment to quality, timeliness, and continuous improvement
- Ability to produce written documents
- Ability to prepare and deliver oral presentations

MEETING PLACE AND TIME:

Class meets one day per week for 3 hours and 40 Minutes.

TOPICAL OUTLINE AND SCHEDULE:

Week	Date Wed.	Topic	Labs & Tests	Homework Problems
1	1/10	Ch. 1: PLC Overview Ch. 2: PLC Hardware Components Lab safety document	1. Relay Logic Introduction	1-5 5
2	1/17	Ch. 5: Basics of PLC Programming	2. Door Control – relay logic	2,4,6
3	1/24	Ch. 6: Developing Fundamental PLC Wiring Diagrams and Ladder Logic Programs	3. Silo Control – relay logic	3,9,11
4	1/31	Ch. 7: Programming Timers	Test 1	3,7,12
5	2/7	Ch. 8: Programming Counters	4. Traffic Control - timers	3,5,8
6	2/14	Ch. 9: Program Control Instructions – jump, subroutine, forcing, temporary end	5. Batch Mix - counters	1,2,3,4
7	2/21	Ch. 10: Data Manipulation Instructions	6. Program Control Lab Manual 9-7,8,9	3,7,8,9,11
8	2/28	Ch. 11: Math Instructions	Test 2	1,7
9	3/7	Ch. 12: Sequencer and Shift Register Instructions	7. Data Manipulation Lab Manual 10-31	1,4
None	3/14	Spring Break - No class		
10	3/21	Ch. 13: Installation Practices and Troubleshooting	8. Shift Register Lab Manual 12-17	1-3, 5-13
11	3/28	TCP/IP and Ethernet Connections Configuring Computer to PLC Communications using RSLinx Ch. 14: Process Control and Data Acquisition	Test 3	1-7
12	4/4	Profibus/Modbus	Project (team) – Understanding the problem	TBA
13	4/11	HMI Programming	Project - Design	TBA
14	4/18	HMI Programming (cont.)	Project – Design & test operation	TBA
15	4/25	Oral presentations/demonstrations [Handout], Evaluation	Project – Test operation	
16	5/2	Final Exam. Project Report due		