Course Syllabus	**EECS 4220 – Programmable Logic Controllers**
Credits & Contact hours	3 credit hours & two 75-minute lecture contact hours.
Coordinator	Dr. William T. Evans
Textbook	Free online text at www.eng.utoledo.edu/~wevans
Course Information	An introduction to programmable logic controllers (PLCs), process control algorithms, interfacing of sensors and other I/O devices, simulation and networking. Prerequisite: EECS 3210 Elective course
Specific Goals- Students Learning Objectives	The student will be able to 1. Demonstrate knowledge of programmable logic controllers. 2. Demonstrate knowledge of process control systems. 3. Program using ladder logic programming of software. 4. Design PLC based system for process control. 5. Use digital and analog I/O. 6. Understand various timers, counters, fault and interrupt systems. 7. Define and design a PLC based process control system, its software/hardware design. 8. Write a report and present results.
Topics	1. Introduction to Programmable Logic Controllers (PLCs) and its architecture. 2. Input/output modules, power supplies, opto isolation and memory map 3. Allen-Bradley Compact Logix Instruction Set 4. Siemens Instruction Set 5. Addressing considerations for both PLC processors 6. IEC 61131-3 programming language standard 7. Ladder logic programming including combinational logic, branching and other rung conditions 8. Start/stop circuits, special contacts, transitional contacts, latching instructions, memory circuit constructs and S/R to Seal Circuit transfer 9. Timers, timing diagrams and examples for timer applications 10. Counter basic programming, Arithmetic, program control instructions

11. Control Panel Construction Standards
12. Control standards external to the Control Panel
13. Analog module-programming examples, Fault and interrupt service routines
14. Sequential Programming Concepts
15. Process control PLC programming including Faceplate
16. HMI Programming Organization
17. Siemens Function/Function Blocks
18. Motion Control of single axis motion systems