



North Central State College
MASTER SYLLABUS
2019-2020

- A. Academic Division: Business, Industry, and Technology
- B. Discipline: Electronic Engineering Technology
- C. Course Number and Title: ELET2240 Programmable Logic Controllers
- D. Course Coordinator: Jonathan DeWitt
Assistant Dean: Toni Johnson, PhD

Instructor Information:

- Name: Click here to enter text.
- Office Location: Click here to enter text.
- Office Hours: Click here to enter text.
- Phone Number: Click here to enter text.
- E-Mail Address: Click here to enter text.

- E. Credit Hours: 3
Lecture: 2 hours
Laboratory: 2 hours
- F. Prerequisites: None
- G. Syllabus Effective Date: Fall, 2019
- H. Textbook(s) Title: Content is on Canvas and Course provided Post Document Files
- I. Workbook(s) and/or Lab Manual: Content is on Canvas and Course provided Post Document Files
- J. Course Description: This course will cover the basic principles behind the operation of programmable controllers, the relationship between PC's and relay ladder logic, programming of PC's, and troubleshooting of programmable controller circuits. CTAG: CTEET003
- K. College-Wide Learning Outcomes

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Use a variety of industrial switches, loads and relays to wire, test and troubleshoot logic circuits from a ladder diagram.	Homework, quizzes, and labs, during weeks 1 – 4 and the midterm and final.
2. Explain and describe the use of numbering systems.	Homework and quiz – week 3, midterm and final.
3. Draw the symbols and describe the function of 80% of the ANSI electrical logic symbols.	Homework, quizzes, and labs, during weeks 1 – 4 and the midterm and final.
4. Discuss the History of control systems and PLCs.	Homework assignment – Week 5
5. Describe the basic operations and functions of a PLC using block diagrams and simplified schematics.	Homework, quizzes, and labs, during week 5 and the midterm and final.
6. Demonstrate editing and programming ability on the PLC using EZLadder software.	Homework, quizzes, and labs, during weeks 5-15 and the midterm and final.
7. Layout, install, test and troubleshoot a PLC system.	Lab – week 5
8. Demonstrate an understanding of 60% of the PLC programming language	Homework, quizzes, and labs, throughout weeks 5-15, the midterm and final.
9. Demonstrate an understanding the use of Ethernet, CAN, DeviceNet, CBus and other industrial networking schemes and the transfer of data.	Homework, quizzes and exercises during weeks 11-12 and the final.
10. Demonstrate an understanding of basic troubleshooting techniques on a PLC.	Lab exercises through the semester.

M. Topical Timeline (Subject to Change):

1. Control devices, sources, loads.
2. Series and parallel Circuits
3. Boolean logic
4. Number systems
5. Control circuits and ladder diagrams
6. History and block diagrams of PLC and PLC modules/
7. PLC Addressing and Memory
8. Status indicators
9. Programming online and offline.
10. Data Types
11. Documentation
12. Faults
13. Bit Instructions
14. Timers and Counters
15. Forcing
16. Math Instructions
17. Comparison Instructions
18. Sequencers
19. Industrial Networks
20. Transfer of Data on industrial networks

N. Course Assignments:

1. Use of forums to discuss class activities, labs and problems.
2. Using a DVM reading and viewing assignment, and lab exercise.
3. Reading assignments and questions from “Basic of Control Systems”.
4. View Videos on basic electricity and answer homework questions.
5. Read assignment and answer questions on Series and parallel circuits.
6. Watch Video, and answer assignment questions on switches.
7. Read the booklet “Ladder Diagrams” and answer homework questions.
8. Read “Digital Logic Functions” and answer homework questions.
9. Perform Logic Lab.
10. Read Relay assignments and answer questions on types, parts of, and implementation of relay circuits.
11. Reading assignments on Electomechanical vs. Solid State relays.
12. Reading assignments on relay voltages, currents and switching capacity.
13. Perform Relay lab.
14. View various videos on PLCs and answer questions about the video topics.
15. Reading assignment on PLCs and the history of.
16. Review of the PLC student kit, installation of EZLadder programming software, USB-to-Serial adapters, connecting the PLC to the PLC and downloading the test program.
17. Read assigned chapters of the “Student Course Study book” and answer assigned questions.
18. Program each weeks PLC lab exercises and submit the program through Canvas.

O. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00-59	F	0.00	Failure

P. Grading and Testing Guidelines:

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Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

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S. Classroom Expectations:

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T. College Procedures/Policies:

Important information regarding College Procedures and Policies can be found on the [syllabus supplement](#) located at

<https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf>

The information can also be found Choose an item.