



North Central State College  
MASTER SYLLABUS  
2019-2020

- A. Academic Division: Business, Industry, and Technology
- B. Discipline: Engineering Technology
- C. Course Number and Title: ENGR 4010 Advanced PLC and Robotics
- D. Course Coordinator:  
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: ENGR2010
- G. Syllabus Effective Date: Fall, 2019
- H. Textbook(s) Title:

*Title TBA*

- Authors:
- Copyright Year:
- Edition:
- ISBN:

- I. Workbook(s) and/or Lab Manual:
- J. Course Description: This course focuses on the use and integration of PLC and Robotic systems with the addition of basic 2D vision systems.
- 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.	Quizzes, exams, and laboratory
2. Demonstrate editing and programming ability on the PLC	Quizzes, exams, and laboratory
3. Demonstrate an understanding the use of Ethernet, CAN, DeviceNet, CBus and other industrial networking schemes and the transfer of data.	Quizzes, exams, and laboratory
4. Demonstrate an understanding of basic troubleshooting techniques on a PLC.	Quizzes, exams, and laboratory
5. Demonstrate an understanding of robotic vision systems.	Quizzes, exams, and laboratory
6. Apply lighting and 2D calibration procedures to industrial vision systems	Quizzes, exams, and laboratory
7. Demonstrate an error proofing vision process	Laboratory

ABET Outcomes:

- *Outcome j.* Electrical circuits (AC and DC) and electronic controls;
- *Outcome k.* Application of industry codes, specifications and standards.

M. Topical Timeline (Subject to Change):

A. Robotics

- 1) Handling and Safety
- 2) Vision Process
- 3) Camera Calibration
- 4) Position and Measurement Data

B. PLC

- 5) Program Sequencing
- 6) Sensor integration
- 7) Discrete I/O handshaking
- 8) Industrial Networks
- 9) Data Exchange
- 10) Human Interface Programing and Setup

N. Course Assignments:

- Laboratory
- Quizzes
- Examinations

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:

Click here to enter text.

Q. Examination Policy:

Click here to enter text.

R. Class Attendance and Homework Make-Up Policy:

Click here to enter text.

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](https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf) located at <https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf>**