North Central State College

MASTER SYLLABUS	2025-2026

A. Academic Division: Engineering Technology, Business & Criminal Justice Division

B. Discipline: Engineering Technology

C. Course Number and Title: ENGR2010 Engineering Programming, Robotics, and PLC

D. Assistant Dean: Brooke Miller, M.B.A.

E. Credit Hours: 3
Lecture: 2 hours
Laboratory: 2 hours

F. Prerequisites: ENGR1010 or ENGR1910

G. Last Course/Curriculum Revision Date: Fall 2025 Origin date: 09/19/2018

H. Textbook(s) Title:

Mechatronics (A-B CompactLogix L16/Studio 5000) Student Reference
- Authors: Amatrol
- Copyright Year: 2016
- Edition: H2005
- **PROVIDED BY INSTRUCTOR**

I. Workbook(s) and/or Lab Manual:

J. Course Description: This course is designed to help students with very little or no computing background, learn the basics of building simple interactive applications. This course will also cover the basic principles behind the operation of programmable controllers, the relationship between PC's and the relay ladder logic, programming of PC's, and troubleshooting of programmable controller circuits. The primary focus is on the use of automatic parts-handling equipment, contour applications and interfacing with emphasis on design for manufacturing. Topics include the use of conveyers, parts feeders, positioning equipment and safety systems. Hands-on laboratory experiences include operation of robots using the teach pendant.

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. Describe computer basics, programs, and operating systems.	Labs, quizzes, and exams
2. Write a simple C++ program for console output.	Labs, quizzes, and exams
3. Identify OSHA's standards and terminology for robotic safety.	Quizzes
4. Demonstrate basic robotic programming commands and concepts, particularly those that are associated with articulated arm robots.	Labs, quizzes, and exams
5. Describe any robot encountered in terms of: arm geometry, power source, drive system, control technique, path control, and possible applications.	Labs, quizzes, and exams
6. Interface external devices such as limit and proximity switches, conveyor systems and other robot controllers to the controller.	Labs, quizzes, and exams
7. Describe and demonstrate the use of ladder programming syntax.	Labs, quizzes, and exams
8. Interpret tags and aliases to differentiate between physical and virtual addresses of external devices and internal memory locations. Demonstrate how to edit ladder logic programs by reassigning addresses, tags and aliases, inserting and deleting rungs, changing data values and documenting instructions, rungs and programs.	Labs, quizzes, and exams

ABET Outcomes:

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

M. 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

N. College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences. Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

* *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at
https://ncstatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDFs/14-081b.pdf

North Central State College

SYLLABUS ADDENDUM

Academic Division:	Engineering Technology, Business, and Criminal Justice	**Discipline:**	Engineering Technology
Course Coordinator:	Jonathan DeWitt		
Course Number:	ENGR 2010	**Course Title:**	Engineering Programing, Robotics, and PLC
Semester / Session:	Spring 2026 / Session A & B	**Start / End Date:**	1/12/2026 – 5/8/2026

Instructor Information

Name:	Jonathan DeWitt	**Phone Number:**	419-755-4776
		E-Mail Address:	jdewitt@ncstatecollege.edu
Office Location:	007 AT Kehoe	**Office Hours:**	M & W – 2:30 PM-4:30 PM

I. Topical Timeline (Subject to Change):

Weeks	Topics	Assignment	Due Date
1	C++ Programming Part 1	C++ Labs 1-3	At close of week 1 as designated in Canvas
2	C++ Programming Part 2	C++ Labs 4-6	At close of week 1 as designated in Canvas
		C++ Programming HW #1	At start of week 1 as designated in Canvas
		Quiz 1	At close of week 1 as designated in Canvas
3	C++ Programming Part 3 and PLC Programming Part 1	C++ Labs 7-8	At close of week 3 as designated in Canvas
		PLC Lap 1 Skill 1 Quiz	At close of week 3 as designated in Canvas
4	C++ Programming Part 4 and PLC Programming Part 2	C++ Lab 9	At close of week 4 as designated in Canvas
		C++ Programming HW #2	At start of week 5 as designated in Canvas
		Studio 5000 Orientation Quiz	At close of week 4 as designated in Canvas
5	PLC Programming Part 3	PLC Lap 1 Skills 2-8	At close of week 5 as designated in Canvas
6	PLC Programming Part 4	Week 6 Quiz	At close of week 6 as designated in Canvas
		PLC Lap 1 Skills 9-10 PLC Lap 2 Skills 2-3	At close of week 6 as designated in Canvas
7	PLC Programming Part 5	PLC Lap 2 Skills 4-8 PLC Lap 3 Skill 1	At close of week 7 as designated in Canvas

Weeks	Topics	Assignment	Due Date
8	Midterm Exam	Theory Midterm Exam Lab Midterm Exam	At close of week 8 as designated in Canvas At close of lab class in week 8 as designated in Canvas
9	PLC Programming Part 6	PLC Lap 3 Skills 2-4	At close of week 9 as designated in Canvas
10	PLC Programming Part 7	PLC Lap 3 Skills 5-8	At close of week 10 as designated in Canvas
11	PLC Programming Part 8	PLC Lap 4 Skills 1-5	At close of week 11 as designated in Canvas
12	Robot Programming Part 1	Fanuc Labs 1-3	At close of week 12 as designated in Canvas
13	Robot Programming Part 2	Fanuc Labs 4-6	At close of week 13 as designated in Canvas
14	Robot Programming Part 3	Fanuc Labs 7-8	At close of week 14 as of designated in Canvas
15	Robot Programming Part 4	Fanuc Labs 9-11, 14	At close of week 15 as designated in Canvas
16	Final Exam	Final Exam Theory Final Exam Lab	Mid-week 16 as designated in Canvas At close of week 16 lab as designated in Canvas

II. Course Assignments:

1. Laboratory
2. Quizzes
3. Exams

III. Grading and Testing Guidelines:

Weekly Quizzes	30 points
Labs	30 points
Midterm Exam	20 points
Final Exam	20 points
Total	100 points

Mid-Term Course Grading Policy

A) North Central State requires that at the mid-point of an academic course, students enrolled in that course be notified of their progress. A letter grade will be calculated based on the work completed at the mid-way point in the term.

B) North Central State College uses the standard 4.00 letter grade system (with pluses and minuses). Faculty will issue a grade to each student at the mid-point in the term and then again at the end of the term. Mid-term grades are not recorded in any permanent record or on a student's academic transcript.

C) Mid-term grades provide students with early feedback (both positive and negative) about their academic performance. Mid-term grades provide an opportunity for students to receive positive reinforcement and motivation if they are doing well, and intervention if they are struggling. Mid-semester grades allow faculty, advisors and other service providers on campus to intervene with students who are in academic difficulty, while there is still time to make improvement.

IV. Examination Policy:

Student must makeup missed Quizzes and/or Exams ***before*** the next class meets.

No makeup exam (Midterm or Final) will be allowed unless the student notifies the instructor within the same day or the following calendar day of the reason for absence.

V. Class Attendance and Homework Make-Up Policy:

Attendance will be taken during every class. No points are deducted for absenteeism, but the student will be dropped for the class for excessive absenteeism.

VI. Classroom Expectations:

As an NC State Student your conduct in this course is subject to the NC State Student Code of Conduct. (See your Canvas course for links.)

As a future professional in your field, you will be expected to conduct yourself as a professional in this course in ALL work and communications - be it assignments, discussion forums, Canvas Inbox, emails etc.

This includes but is not limited to:

- Being respectful of classmates' opinions, work and comments
  Good test = Is this something I would/should say to a co-worker in person?
- Being respectful in communications with the instructor
  Good test = Is this something I would/should say to my boss in the workplace?
- Being respectful of diversity
  Good test = Is this a comment/joke that is at some other groups, ethnicity, political etc. expense?
  Note: Offensive "jokes", slurs or hate speech will NOT be tolerated
- Using Non-Profane, Appropriate Language
  Good test = Is this language you would use in the workplace or in front of your grandmother?
- Using proper. NON-"Text speak" Language to make Yourself Easily Understood
  Good test = Could my older boss understand what I have written?

Failure to conduct yourself as a professional and meet standards above in this course will result in the following consequences in this course:

- 1st Instance = Written warning from the instructor documenting issue
  (No points deductions)
- 2nd offense = Mandatory meeting with the instructor and or Department Chair or Division Dean
  (Related assignment/Participation subject to Point Deductions)
- 3rd offense: College Disciplinary procedures filed with the NC State Judicial Committee as a violation of the Student Code of Conduct.
  (Course Grade subject to F)

Extreme or repeated unprofessional behavior will result in initiating college disciplinary procedures as outlined in the NC State Student Code of Conduct. NCSC Disciplinary hearings can result in a variety of consequences, including and up to suspension or being expelled from the college.