



## North Central State College

**MASTER SYLLABUS**

**2025-2026**

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

B. Discipline: Mechanical Engineering

C. Course Number and Title: ENGR 4210 Design of Engineering Experiments

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

E. Credit Hours: 3

F. Prerequisites: MATH1151

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

H. Textbook(s) Title:

*Introduction to the Design & Analysis of Experiments*

- Authors: Canavos, Koutrouvelis
- Copyright Year: 2009
- Edition: 1st Edition
- ISBN: 9780136158639

I. Workbook(s) and/or Lab Manual: None; Class Handouts will be distributed

J. Course Description: This course prepares students to analyze statistically designed experiments and their importance in data analysis, industrial experiments, role of randomization, fixed and random effect models and ANOVA, block design, Latin square design, factorial and fractional factorial designs and their analysis.

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. Definition of an experiment	Report, quiz, midterm, final
2. Design of experiments statistical problem solving and analysis	Quiz, midterm
3. Use of Minitab software	Lab work, quiz and midterm, final
4. Design an experiment	Quiz, report
5. Perform a factorial analysis	Quiz, midterm, and final
6. Perform an ANOVA analysis	Quiz, midterm, and final
7. Perform a Weibull analysis	Midterm and final exam
8. Perform a Taguchi analysis	Midterm and final

ABET Outcomes:

- *Outcome b.* Use of computer aided drafting and design software;
- *Outcome c.* Perform selection, set-up, and calibration of measurement tools/instrumentation;
- *Outcome k.* Application of industry codes, specifications and standards;
- *Outcome l.* Technical communication typically used in preparation of engineering proposals, reports, and specification.

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 & Criminal Justice Division	Discipline:	Mechanical Engineering Technology
Course Coordinator:	Brooke Miller		
Course Number:	ENGR-4010-30	Course Title:	Advanced PLC and Robotics
Semester / Session:	Spring 2026/ Full Term	Start / End Date:	1/12/2026 thru 5/08/2026

**Instructor Information**

Name:	Hemanta Dulal	Credentials:	MS in Mechanical Engineering
Phone Number:	419-755-4702	E-Mail Address:	hdulal@ncstatecollege.edu
Office Location:	Kehoe Center Room 005	Office Hours:	By Appointment (MW 1:45-5:00PM)

**I. Topical Timeline / Course Calendar (Subject to Change):**

Class	Week of:	Topic	Chapter/section	Homework
1	12/01/2026	PLC Counter Instructions	Allen-Bradley LAP 5	Skill Assessment
2	19/01/2026	<i>Class Work # 1 &amp; 2</i>		
3	26/01/2026	Event Sequencing	Allen-Bradley LAP 6	Skill Assessment
4	02/02/2026	<i>Class Work # 3 &amp; 4</i>		
5	09/02/2026	Application Development	Allen-Bradley LAP 7	Skill Assessment
6	16/02/2026	<i>Class Work # 5 &amp; 6</i>		
7	23/02/2026	Program Control Instructions	Allen-Bradley LAP 8	Skill Assessment Midterm Exam
8	02/03/2026	<i>Class Work # 7 &amp; 8</i>		
9	09/03/2026	<i>Spring Break – No Class</i>		
10	16/03/2026	Math and Data Move Instructions	Allen-Bradley LAP 9	Skill Assessment
11	23/03/2026	<i>Class Work # 9 &amp; 10</i>		
12	30/03/2026	Integrated PLC Application (LAP 5–9)	Allen-Bradley Manuals	Skill Assessment
13	13/04/2026	<i>Class Work # 11 &amp; 12</i>		
14	06/04/2026	Troubleshooting & Optimization	Allen-Bradley Manuals	Skill Assessment
15	13/04/2026	<i>Class Work # 13 &amp; 14</i>		
16	20/04/2026	Project work based on Arduino presentation at the end		
17	27/04/2026	Review		
18		<b>Final Exam</b>	<b>All Chapters</b>	Final Exam

**II. Grading and Testing Guidelines:**

Final Grade Calculation

Activity	Qty	Points	Percentage
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Quizzes			10%
Mid-term			25%
Final			25%
Class Work			40%

### III. Examination Policy:

1. The reasons for which a student will be excused from taking an examination \_\_\_\_\_
  - a. Hospitalization (with documented verification)
  - b. Death in the immediate family (with documented verification)
  - c. Personal illness or illness in immediate family - (doctor's excuse required).
2. A student who misses an examination for any reason is responsible for loss of the points.
3. No makeup opportunity will be given for absences of unscheduled quizzes.

### IV. Class Attendance and Homework Make-Up Policy:

Attendance Requirements: All students are required to attend all scheduled classes and examinations. Each faculty member has the right to establish regulations regarding attendance that he/she considers necessary for successful study.

Students who do not attend classes may be administratively withdrawn from those classes. However, failure to attend classes does not constitute withdrawal, and students are expected to process a formal withdrawal through the Student Records Office in Kee Hall.

### V. Classroom Expectations:

As a NC State Student, be it it online or hybrid, your conduct in this course is subject to the NC State Student Code of Conduct. [Links to an external site.](#)

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 [Links to an external site.](#) 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](#). [Links to an external site.](#) NCSC Disciplinary hearings can result in a variety of consequences, including and up to suspension or being expelled from the college.