New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

**Department of Engineering Technology**
GITC Building Suite 2100
Phone: 973.596.3228
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NEWARK COLLEGE OF ENGINEERING

# SYLLABUS AND COURSE INFORMATION

| | |
|---|---|
| **Course Name:** | Computerized Industrial Controls |
| **Course Number:** | ECET 350 |
| **Course Structure:** | 2-2-3 (lecture hr/wk – lab hr/wk – course credits) |
| **Course Description:** | This course introduces students to the theory and application of computerized control systems and technologies used in industry today. The course focuses on the hands-on development and integration of programmable logic controllers (PLCs), motor controllers (drives), and supervisory software. |
| **Prerequisites:** | (ECET 211 or CPT 315 or ECE 252) and ECET 311 and Junior or Senior Standing |
| **Corequisites:** | None |
| **Required, Elective, or Selected Elective:** | Elective |
| **Required Materials:** | **Programmable Logic Controllers, 6th Ed.** by Frank D. Petruzella, McGraw Hill, ISBN 9781264163342<br><br>**Programmable Logic Controllers Lab Manual, 6th Ed.** by Frank D. Petruzella, McGraw Hill, ISBN 9781264446766<br><br>**PLC Software,** http://thelearningpit.com "LogixPro Allen Bradley RSLogix Simulator" |
| **Course Outcomes:** | By the end of the course students are able to:<br>1. Understand and read basic ladder logic diagrams and relate such to basic digital logic symbols and state diagrams.<br>2. Develop, program, implement and test ladder logic programs in industrial applications.<br>3. Understand basic motor control and automation theory, including both digital and analog applications<br>4. Convert ladder logic to its Boolean equivalent and use Boolean techniques to simplify and analyze complex ladder logic programs<br>5. Understand the use and application of specialized PLC functions such as counters, timers, specialized relays, high speed counters, latches and arithmetic functions.<br>6. Demonstrate the ability to create structured programs utilizing conventional methods of labeling, describing and documenting programs.<br>7. Analyze, design and configure PLC programs to run rudimentary automation applications. |

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8. Understand the operation the various file types and practice using each in program development.
9. Understand the concepts of memory allocation, memory addressing and memory access in a PLC system.
10. Differentiate between and design programs that minimize memory or scan times.
11. Calculate theoretical scan times and understand their effect on system operation.
12. Understand the various hardware configurations and troubleshoot both hardware and software in a simulated industrial environment.

**Class Topics:**

| | |
|---|---|
| Ladder Logic | Motor Control |
| Automation Theory | Counters & Timers |
| PLCs | Troubleshooting |
| Relays | Sensors |

**Academic Integrity:** Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

**Generative AI** Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is not permitted to be used in the assignments noted by the instructor, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. If you have any questions or concerns
about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

**Modification to Course:** The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course Outline.

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**Prepared By:** Daniel Brateris
**Course Coordinator:** Daniel Brateris
**Updated:** 5 September 2025

## SECTION SPECIFIC INFORMATION:

## Instructor Information:

**Name:** Mr. S. Dyer
**Email:** snb0319@njit.edu **Phone:** N/A

**Office:** N/A
**Office Hours:** By appointment.

## Course Information:

**Semester:** Fall 2025
**Course Name:** Computerized Industrial Controls
**Course Number:** ECET 350
**Course Section:** 101

| **Meeting Times:** | **Day** | **Meeting Time** | **Building** | **Room** |
|---|---|---|---|---|
| | Friday | 6:00 M | GITC | 2308 |

## Grading Policy

Your final grade will be determined according to the following scale:

| **Final Grade** | **Range** |
|---|---|
| A | 90 to 100 |
| B+ | 85 to 89 |
| B | 80 to 84 |
| C+ | 75 to 79 |
| C | 70 to 74 |
| D | 60 to 69 |
| F | 0 to 59 |

Assignments will be weighted towards your final grade by these percentages:

**Homework:** 10%
**PLC Exercises:** 20%

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| | |
|---|---|
| **PLC Project** | 20% |
| **Exam 1:** | 10% |
| **Exam 2:** | 10% |
| **Final Exam:** | 30% |

## Exam and Quiz Policy

Include an exam policy that includes your make up policy.

There are two quizzes during the semester. There will be no makeup quizzes.

**HOMEWORK, PLC EXERCISES, & PROJECT - IMPORTANT**

**Homework**

1. Homework is due at the beginning of the class period, one week after it is assigned.
2. Late homework will be penalized one problem grade per week. Assignments more than one week late will not be accepted.
3. Homework will not be accepted after graded homework has been returned or reviewed.
4. Homework must be submitted in sets, arranged in order as in course outline. Sets must be stapled together in the upper left hand corner.

**PLC Lab Exercises**

1. Lab exercises must be demonstrated during the lab, and write up due at the beginning of the class period, one week after it is assigned.
2. Late Lab exercises will be penalized minus 25% each week. Assignments more than one week late will not be accepted.
3. PLC exercises must be submitted in sets, arranged in order as in course outline. Sets must be stapled together in the upper left hand corner.

**Automation Final Project**

1. The final project is due on the date indicated. No late projects will be accepted.
2. The Project should be submitted in the format provided by the professor.

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## Week By Week Schedule

| WEEK | DATE | TOPICS | SECTIONS | ASSIGNMENTS |
|---|---|---|---|---|
| 1 | 9/5 | Introduction to Electronics & PLCs<br><br>Fundamentals of Ladder Logic Programming | 1.1-1.3<br><br>5.6, 5.8-5.10 | PLC Exercise 1<br><br>Ch. 1 Review Questions: 1, 3,<br>10<br><br>Ch. 5 Review Questions: 7<br><br>Lab Manual vii-xii |
| 2 | 9/12 | Application Development Part 1<br>PLC Addressing | 5.1-5.5 | PLC Exercise 2<br><br>Ch 5 Problems: 1<br><br>Lab Manual:1-2 through 1-5 |
| 3 | 9/19 | Application Development Part 2<br>PLC Timers | Chapter 7 | PLC Exercise 3<br><br>Lab Manual: 7-12<br><br>App Development Hmwk Part 1 (due week 6) |
| 4 | 9/26 | **Quiz No. 1**<br><br>PLC Motor Control Part 1 | Class Handouts<br>6.1-6.3 | PLC Exercise 4<br><br>Lab Manual: 6-15<br><br>**Class Project Assigned** |
| 5 | 10/3 | PLC Counters<br><br>PLC Motor Control Part 2 | Chapter 8.1-8.4 | Lab Manual: 8-3<br><br>PLC Exercise 5 |
| 6 | 10/10 | PLC Pneumatic Cylinder Control<br><br>Event Sequencing | Class Handouts<br><br>6.10-6.11 | PLC Exercise 6<br><br>Lab Manual: 7-26 |

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| WEEK | DATE | TOPICS | SECTIONS | ASSIGNMENTS |
|---|---|---|---|---|
| 7 | 10/17 | Overview of Number Systems<br>Sensors<br><br>Human Machine Interfaces Part 1 | Chapter 3<br>6.4-6.6 | PLC Exercise 6 Cont. PLC Exercise 7 Start<br><br>Ch. 3 Review Questions: 1-7<br><br>Lab Manual: 7-17 |
| 8 | 10/24 | **Quiz No. 2**<br><br>Human Machine Interfaces Part 2 | 9.1-9.3 | PLC Exercise 7 Cont.<br><br>Lab Manual 8-32 |
| 9 | 10/31 | Installation & Wiring Automation<br>Safety PLC Stop Functions<br><br>Sub-Routine & Jump | 13.1-13.4<br>9.6 | PLC Exercise 8<br>Ch. 13 Review Questions 1,2,7<br>App Development Hmwk Part 2 due Week 11 |
| 10 | 11/7 | Analog Sensors<br><br>Stepper & Servo Motors | Class Notes 6.4-6.6 | Lab Exercise_App Development Hmwk_AI Generate<br>Lab Manual 6-11(a) |
| 11 | 11/14 | Math Instructions | 11.1-11.6 | PLC Exercise 9<br>PLC Exercise 10<br><br>Lab Manual 11-4 |
| 12 | 11/21 | LAB TIME | | |
| 13 | 11/26 (Wed.) | LAB TIME | | |
| 14 | 12/3 | Class Presentations | | Class Project Due |

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| WEEK | DATE | TOPICS | SECTIONS | ASSIGNMENTS |
|---|---|---|---|---|
| | TBD | FINAL EXAM | | |