

Mr.D (Don Wilcher)

Control Systems - ET345, Winter Qtr, 2009

Thursday 5:00pm-10:30pm

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Course Outline and Objective:

This course is intended to introduce the CEET (Computer & Electronics Engineering Technology) student to Industrial Control Systems using PLCs (Programmable Logic Controllers. The architecture of PLCs, wiring diagrams, Ladder Logic programming will be presented to the classroom lectures and laboratory exercises and projects. Timers, Counters, Data Manipulation, and Control Instructions will be illustrated via hands-on labs using an actual PLC and simulation software. In addition, the multidisciplinary field of Mechatronics will be discuss as it relates to current technology trends from trade publications and research literature.

The materials presented in class will illustrate controls system architectures and implementation strategies via wiring diagrams and Ladder Logic programming of PLCs. Simulation methods to validate Ladder Logic designs will be carried out using LogixPro software. Binary data manipulation and I/O circuits used internally of the PLC modules will be explored from a Ladder Logic perspective. The **emphasis** of this course is **hands-on**: In other words this class is about **building** practical control and detection devices and writing embedded software in Ladder Logic Language. I encourage all students to build the I/O interfaces and writing Ladder Logic programs so the experience of identifying module terminal strip configuration, component wiring, troubleshooting, and operating electronic measurement instrumentation can be incorporated within your CEET tool box of knowledge. This course will demand out of class activities via the software simulation studies and debugging techniques as well as writing detail lab reports and research assignments using the ITT Tech Virtual Library. The skills obtained in this course are essential to having a successful career in Electrical, Electronics, and/or Computer Engineering. Therefore, it is imperative that total participation of the student is required to fulfill this career-training goal.

Course Requirements:

Regular attendance of each class session per week for 10 weeks

- Quizzes
- Homework Problem Sets, Pre-Lab Assignments and Virtual Library Assignment(s)
- 2 Exams
- Lab Projects & Reports
- Lab Notebook
- Final Exam
- Final Lab Project

Course Themes:

New Product Development Techniques, Mechatronics, Human-Machine Interfacing, Industrial Controls, and DIY Discovery through Innovation

Grading scheme:

Quizzes: 10%

Homework [Pre-Labs + Homework Assignments + Virtual Library Assignments] 20%

Exams: 15%

Lab Projects + Lab Notebook+ Lab Reports 20%

Final Exam: 15%

Final Lab Project: 20%

Grading Scale:

A 90 - 100%: 4.0

B+ 85 - 89%: 3.5

B 80 - 84%: 3.0

C+ 75 - 79%: 2.5

C 70 - 74%: 2.0

D+ 65 - 69%: 1.5

D 60 - 64%: 1.0

F <60%: 0.0

D.Wilcher

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Electronics Lab Ground Rules:

1. No food is allowed in the lab.
2. No horse play will be tolerated while conducting lab experiments
3. Respect of classmates and the educational institution's property is required of each student at all times.

Note: A 1 time warning of the above restrictions will be given to the student. 2nd time offense will require school disciplinary action.

Pre-Lab and Lab Report Turn In Requirements

1. Pre-Labs are due the day of the Lab.
2. Lab reports a week after performing the experiment.
3. In the event of an absence, the Pre-Lab and Lab report can be emailed or turned in ahead of time prior to arrange time made by the student and the instructor.

Additional Information:

- Attendance is essential to doing well in the course. The Final Exam is comprehensive and will focus primarily on material presented in the lecture/homework assignments and lab exercises.
- **ALL ASSIGNMENTS WILL BE POSTED ON THE INSTRUCTOR'S WEBSITE.** If you are unable to attend a lab session, it is your responsibility to obtain the material from other students, or instructor's website.
- Completion of all elements of the *Grading Scheme* is required in order to receive a passing grade.
- Should you encounter any problems please contact the instructor ahead of time via email.
- Full credit at the beginning of class on the due date.
- **A 2week grace period for excused late assignments will be granted by the instructor. If late assignment is granted, 30pts will be taken from the assignment. No late assignments will be taken after the 3rd week of the quarter.**