Cleveland State University
Department of Electrical Engineering

EEC 441 Fall 2004 CONTROL SYSTEMS LABORATORY

COURSE OBJECTIVES:

1. To give the student "hands-on" experience with processes, control equipment, and instrumentation in a control system environment.
2. To illustrate and therefore reinforce the control systems theoretical relationships the student learned in the control systems lecture course. At the same time, an objective is to make the student aware of problems associated with the process of reducing theory to practice by having him or her compare theoretical results with those obtainable in practice.
3. To train the student in safe and acceptable test procedures used in performing laboratory work.
4. To develop the student's proficiency in taking experimental data and in writing good technical reports.
5. To give the student an opportunity to function as part of a team.

PRE or CO-REQUISITE: EEC 440 Control Systems.

LOCATION: SH325, Th 9:00-12:00

INSTRUCTOR: Frank Goforth, SH-315, 216-8759667, f.goforth@csuohio.edu
                     http://academic.csuohio.edu/cact/frank/eec441

TEXT: None. Students are given a copy of the introduction and experimental procedure for each experiment. Reference texts are:
        Karl J. Åström & Tore Hägglund, *PID Controllers: Theory, Design and Tuning, 2nd ed.,* ISA Press, 1995
        Katsuhiko Ogata, *Modern Control Engineering, 4th ed.,* Prentice Hall, 2002
        Norman S. Nise, *Control Systems Engineering, 4th ed.,* John Wiley& Sons, 2004
        R. Dorf and R. Bishop, *Modern Control Systems, 10th ed.,* Prentice Hall, 2004.

GRADES: Weekly Quizzes – 20% **Quizzes are given promptly at beginning of class and end promptly after 10 minutes.**
        Reports (6) – 80% **All reports are due the last class in semester, else fail the course**.

DEADLINES: Reports are due one week from the experiment's scheduled completion date. **Late reports lose one letter grade every 2 weeks.**

DECORUM: Arrive on time. Pay attention. Do not disturb others. Turn off your mobile phone, and should you forget, do not answer it and do not leave the class to answer it.

This should be a contemplative time away from your boss. Inform others to call 216-6872589 for real emergencies. Please notify the instructor prior to class if a personal emergency requires you to leave during class.

SYLLABUS:

DATE	EXPERIMENT	PREPARATION
2004/09/02	Introduction to the Lab and the experiments. Introducton to SIMULINK.	None.
2004/09/09	Quiz #1.Experiment #1: The Torsion Mechanism - Familiarization and Basic Closed Loop Control.	Read experimental procedure.
2004/09/16	Experiment #1—continued.	Review previous week's work.
2004/09/23	Quiz #2. Experiment #2: First Principles Modeling of the Controlled System (Torsion Mechanism).	Compute load inertia, and read procedure.
2004/09/30	Experiment #2—continued.	Review previous week's work.
2004/10/07	Quiz #3. Experiment #3: Closed Loop Steady State Error and Transient Performance.	Know "system type", answer pre-lab questions, read procedure.
2004/10/14	Experiment #3—continued.	Review previous week's work.
2004/10/21	Quiz #4. Experiment #4: Empirical Modeling of the Controlled System.	Read procedure; answer pre-lab questions.
2004/10/28	Experiment #4—continued.	Review previous week's work.
2004/11/04	Quiz #5. Experiment #5: Position Control/ Control Against Disturbances Using an Inner Speed Loop.	None (lab introduced with lecture)
2004/11/11	Experiment #5—continued.	Review previous week's work.
2004/11/18	Quiz #7. Experiment #7: PI Control of Liquid Level, and Controller Tuning Using the Ziegler-Nichols Tuning Method.	Read procedure; answer pre-lab questions.
2004/11/25	**Holiday.**	
2004/12/02	Experiment #7—continued.	Review previous week's work.
2004/12/07	Complete any late lab reports.	

The syllabus content and schedule is subject to change as required during the semester. Changes in due dates will be announced in class. It is the students' responsibility to be aware of any changed date announcements. Your email address as listed in school records will be used for any announcements not made during class, it is the student's responsibility to assure the address is correct and check their email.