

# ECE 3557: Control Systems Laboratory

## Course Description

Utilization of real-world plants for computer control; use of a commercially available software package (Matlab) for computer-aided analysis and design.

**Prior Course Number:** 557

**Transcript Abbreviation:** Control Laboratory

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad

**Student Ranks:** Junior, Senior

**Course Offerings:** Autumn, Spring

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 1.0

**Repeatable:** No

**Time Distribution:** 3.0 hr Lab

**Expected out-of-class hours per week:** 0.0

**Graded Component:** Lecture

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:** Prereq or concur: 3551 (551), and enrollment in ECE or EngPhysics major.

**Exclusions:** Not open to students with credit for 557.

**Cross-Listings:**

**Course Rationale:** Existing course.

**The course is required for this unit's degrees, majors, and/or minors:** No

**The course is a GEC:** No

**The course is an elective (for this or other units) or is a service course for other units:** Yes

**Subject/CIP Code:** 14.1001

**Subsidy Level:** Baccalaureate Course

## Programs

Abbreviation	Description
CpE	Computer Engineering
EE	Electrical Engineering

## Course Goals

Utilize real-world plants for computer control, and learn to use a commercially available software package (Matlab) for computer-aided analysis and design

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Instrumentation and software			3.0					
Analog simulation			3.0					
Gain compensation and feedback			6.0					
Lag compensation			6.0					
Lead compensation			6.0					
Compensation for sampled data systems			3.0					
Tuning an analog PID controller			6.0					
Tuning a digital PID controller			6.0					

## Representative Assignments

Pre-lab assignment carried out prior to entering lab
Lab write-up focused on topics

## Grades

Aspect	Percent
Pre-labs	15%
Individual lab write-ups	60%
Lab practical exam	25%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Control Systems Technology Lab</i>	Yurkovich and Abiakil

## ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
***	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
***	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
***	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## CpE ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
**	1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
	2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	3	an ability to communicate effectively with a range of audiences
	4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
	5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
**	6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
*	7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

### EE ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
**	1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
	2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	3	an ability to communicate effectively with a range of audiences
	4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
	5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
**	6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
*	7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

### Additional Notes or Comments

Updated prereqs, exclusions, goals and topics to match university format 3/20/12

update text info, 5/10/17, CED

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