

ECE 5557 (Approved): Control System Implementation Laboratory

Course Description

Laboratory study of advanced feedback control techniques as applied to nonlinear and multi-output systems under computer control.

Prior Course Number: 758

Transcript Abbreviation: Control Imp Lab

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Undergrad, Graduate

Student Ranks: Junior, Senior, Masters, Doctoral

Course Offerings: Spring

Flex Scheduled Course: Never

Course Frequency: Odd Years

Course Length: 14 Week

Credits: 2.0

Repeatable: No

Time Distribution: 1.0 hr Lec, 4.0 hr Lab

Expected out-of-class hours per week: 1.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites: Prereq: 3551 (551), or Grad standing in Engineering or Math and Physical Sciences.

Exclusions: Not open to students with credit for 758.

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: Doctoral Course

Programs

Abbreviation	Description
CpE	Computer Engineering
EE	Electrical Engineering

Course Goals

Design and implementation of advanced feedback control techniques for nonlinear and multi- output systems under computer or microprocessor control
Promote team efforts via working with lab partner(s)

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Data acquisition	1.0		4.0					
Modeling and system identification	1.0		4.0					
PID, derivative filtering, antiwindup	1.0		4.0					
Linear quadratic regulator and observer	1.0		4.0					
Nonlinear control	1.0		4.0					
Distributed control and resource allocation	1.0		4.0					
Advanced topics in open design lab I: Adaptive control, advanced nonlinear control, multivariable control, robust control, distributed control and resource allocation	3.0		12.0					
Advanced topics in open design lab II: Adaptive control, advanced nonlinear control, multivariable control, robust control, distributed control and resource allocation. Project lab will take on the character of a final project for the laboratory.	4.0		16.0					

Representative Assignments

Prelab, postlab reports for each of the above-listed laboratories

Grades

Aspect	Percent
Prelabs and postlabs for 9 laboratory projects	70%
Final design project is the last laboratory project	30%

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.

Additional Notes or Comments

Changes prereqs, exclusions, goals and topics to match university format.

expand to 2 credits, change prereqs 10/30/12. Add topic.

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