

ECE 5557: 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

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| 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

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