SE 320
Control Systems
TR 12:30-1:50 pm
in-person lectures

Instructor: Rasoul Etesami (*etesami1@illinois.edu*), Website: https://ise.illinois.edu/directory/profile/etesami1
Office Hours: Thursdays 4:00-5:30pm

TAs: Angela Chan (*angelac4@illinois.edu*), Office Hours: TBD
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Required Text: *Feedback Control Systems:* **Fifth Edition**, 2010
by Charles L. Phillips and John M. Parr, Prentice-Hall publ.

Specific Course Information

- **Course Description**: Fundamental control systems and control systems technology. Sensors, actuators, modeling of physical systems, design and implementation of feedback controllers; operational techniques used in describing, analyzing and designing linear continuous systems; Laplace transforms; response via transfer functions; stability; performance specifications; controller design via transfer functions; frequency response; simple nonlinearities.
- **Prerequisites**: CS101, MATH 285, & TAM212, Credit or Concurrent registration in ECE211
- **Labs**: The information related to the labs can be found on: http://coecsl.ece.illinois.edu/se320/

Assignments and Exams:

- There will be **6 homeworks** posted approximately every-other-week. Homeworks and their solutions will be posted in *Canvas.illinois.edu*. Solutions will be due *before* the beginning of the lecture. Two or three problems will be selected "randomly" from each assignment for grading. Solutions for all problems will be provided.
- **No late homeworks** will be accepted. However, each student's lowest homework score will be dropped before course grades are computed. It is important to write your solution clearly as it may affect your grades. No collaboration or other solution sources are allowed on the problems assigned for homeworks or exams. Otherwise, UIUC student code § 1-402 on academic dishonestly will be followed.
- There will be one midterm exam during the semester. **Tentative Date: October 27, 7pm-9pm**.
- There will be one final exam which will be held in the final week (the exact time and instructions will be announced later in the semester).
- For the students who need accommodation, please submit your forms no later than September 15.

Tentative Course Outline:

Reading	Topics	Lectures
Chapter 1	Introduction to Control Systems	Week 1
Appendix B	Laplace Transforms: definition of Laplace transform and inverse Laplace transform; examples of common transforms; properties and theorems	Weeks 1-2
Chapter 2	Mathematical Models for Physical Systems: circuits, mechanical systems, electromechanical systems transformers and gears, more examples	Weeks 2-4
Chapter 4	System Responses to Inputs: responses in time-domain and frequency domain; design specifications	Weeks 4-5
Chapter 5	Closed-loop Systems: stability; transient response and steady state response; sensitivity	Weeks 5-7
Chapter 6	Stability Analysis: history and notions of stability; Routh-Hurwitz criterion; roots of the characteristic equation	Weeks 8-9
Chapter 8	Frequency Response Analysis: frequency responses; Bode diagrams; Nyquist Criterion	Weeks 10-12
Chapter 9	Frequency Response Design: gain compensation; lag and lead compensation; lag-lead compensation PID design and implementation	Weeks 13-14

Course Grade Composition:

Item	% of grade
Homework Problem Sets	40%
Midterm Exam	20%
Final Exam	20%
Lab Reports	20%

- Total Score ≥ 94: A+, Total Score ≥ 87: A, Total Score ≥ 83: A-
- Total Score ≥ 78: B+, Total Score ≥ 74: B, Total Score ≥ 70: B-
- Total Score ≥ 67: C+, Total Score ≥ 64: C, Total Score ≥ 60: C-
- Total Score ≥ 50: D, Total Score < 50: F.