

Department of Electrical and Computer Engineering
Mississippi State University

Welcome to ECE 4913/6913: Feedback Control Systems I, Fall 2024

This course is offered in person. Some course material, including homework assignments and their submission and grading, are shared through the Canvas course page.

Official class times and location: MWF: 11-11:50 AM, Simrall 102

Official start date: Wednesday, August 21, 2024

Office Hours: MWF: 10:15-10:45 PM, Simrall 237. If you need to meet outside this time, let me know.

Objectives of the Course

1. Understanding the principles of feedback control systems. 2. Modeling of systems using transfer functions and state space models. 3. Methods for analysis of system equations and designing a feedback controller: Stability analysis, Root-locus, Nyquist method, and Bode plots. 4. Simulating the systems in Matlab/Simulink.

Textbook: Feedback Control Systems, by C. L. Phillips and J. M. Parr, 5th edition, 2011.

Software: Matlab/Simulink or any other software platform that can simulate basic control system functions. There will be part of the course assigned for working with Matlab and Simulink.

Laboratory: This course has a laboratory component. It consists of 4 or 5 experiments. Each experiment will normally take 1.5-3 hours and is performed in teams of 2-4 students. The lab experiments start several weeks into the course and we will schedule it later. The lab is located on the third floor of the Simrall Building, Room 327.

Contents*

- 1) Introduction: review of preliminary mathematics and Matlab
- 2) Models of physical systems
- 3) State-space models
- 4) System responses
- 5) Control system characteristics
- 6) Stability analysis
- 7) Root-locus analysis and design method
- 8) Frequency response analysis
- 9) Frequency response design
- 10) Modern control designs**

* The contents are chiefly followed from the textbook while additional topics, concepts, and examples will also be included sporadically.

** Time permitting

Grading: You will regularly receive assignments (20%) which include analysis and computer simulations related to what you learn in the class. You will also be given 3 tests (30% total) during the semester, and a final exam (30%). Your grade will be determined based on these, as well as your lab reports (20%).

I wish you a good semester. Please feel free to contact me for questions and comments about this course.

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