

## ME-303: Control System Design

**Instructor(s):** Melih Turkseven

melih.turkseven@sabanciuniv.edu (FENS-L018)

**Office Hours:** Monday 15:30-16:30, Wednesday 13:40-14:30 or by appointment

Assistants: Ali Yasar <aliyasar@sabanciuniv.edu>

Selim Ahmet Iz <izselim@sabanciuniv.edu>,

Burak Oztoprak <burakoztoprak@sabanciuniv.edu>

### Course Content:

This course introduces fundamental approaches to control system design. Specific topics include: design in frequency domain; design using the Root Locus; design of state variable feedback systems; controllability; observability; pole placement using state feedback; limitations of state variable feedback; state observers; the design of robust control systems.

### Objectives:

Objective of the course is to enable students to understand why automatic control is useful, recognize the value of integrated control and process design, identify when a process is easy or difficult to control, learn key ideas and concepts in dynamics and feedback, grasp relevant mathematical theory, be able to solve some important control problems and recognize difficult ones, and be aware of computational tools.

**Textbook:** G.F. Franklin, J.D. Powell and A. Emami-Naeini: Feedback Control of Dynamic Systems (6th or 7th Edition), Prentice Hall.

### Course Outline:

- Motivation for applying Feedback Control - Dynamic Models & Dynamic Response - Basic Properties of Feedback - The Root-Locus Design Method	- The Frequency-Response Design Method - State-Space Design - Digital Controller Implementation
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### Grading:

Final: %30	Midterm: %20	Quizzes: %15	Homeworks: %20	Project (Lab): %15
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### Important Notes:

#### Assessments (Quizzes, Final Exam, Midterm Exam)

- Will be conducted on Zoom. Students are required to turn on pc cameras, and mics. The assessment sessions can be recorded.
- Students may be called for oral assessments in the following days of exams.
- To qualify for make-ups the average score of both homework assignments, and quizzes should be at least 20 out of 100.

- Any possible make-up exam will be scheduled at the end of the semester. In fairness to those who take the original exam, the make-up will include all the topics covered at the time of the exam. All the excuses and medical reports must be submitted **before** the exam.
- The lowest score among homework assignments will be dropped.

Schedule of the week:

- Lectures will be live, these sessions will be recorded and made available.
- A weekly quiz will be conducted in the second hour of the Wednesday sessions. The quiz will span the materials covered in the same week. These quizzes will cover the materials of the previous week.
- Further instructions on the lab sessions will be shared later in the semester.