EE 4213-100 / 5213-100
Feedback Control Theory
Spring 2024

When & Where: 3:05 – 4:00pm MWF, in ARC-101

Instructor: Prof. J. Zhu
Stocker 353
zhuj@ohio.edu

Office Hours: 4:10 – 5:00 MWF, or by appointment

Required Text: Norman Nise, Control Systems Engineering, 8th Edition, Wiley and Sons.

Prerequisites: EE 3334 or permission

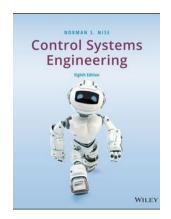**Course Description:**   Introduction to analysis and design of feedback control systems. Introductory topics include mathematical modeling and computer simulation of physical systems, linear approximations of nonlinear systems, transfer function and state equation representations, and feedback control system block diagrams, characteristics, and performance specifications. Also covered are frequency domain methods for stability, sensitivity, robustness, and performance analysis and techniques for compensator design and simulation verification. MATLAB® and Simulink used extensively.

Grading:

Assignments	EE4213	EE5213
Homework (12 nominally)	36% (3% each)	24% (2% each)
Midterm Exam (1)	30%	30%
Final Exam (1)	34%	34%
Project [EE5213 only]	N/A	12%

Notes:

- Homework will be assigned and graded weekly. Completed assignments will be submitted by the due date/time on Blackboard in **one** integrated PDF file. solutions will be posted on Blackboard and discussed in class. *Late homework will not be accepted once the solution has been posted*.

- Graduate students in EE5213 will have an extra project assignment, which will be completed in an ongoing fashion. The project will count for 12% of the course grade, of which 6% will be based on the final project report, and 1% will be assigned to each of six progress reports due at the end of each module.

- There is no laboratory component in this course. We will use online resources and try to make some lab demos of the operation and characteristics of the various control systems. Beneficial lab components may be added and graded as optional bonus points.

- An in-class, proctored midterm test is tentatively scheduled for **Friday, March 1, 2024**. The test will be a comprehensive exam for the contents covered from

the beginning of the course (Modules 1-3, Chapters 1-7, 10 of Textbook). The test will be closed-book, but a review formula sheet will be allowed.

- A two-hour, in-class, proctored comprehensive final exam is scheduled for **12:20-2:20 PM EST**, **Wednesday, May 1, 2024.** The exam will be a comprehensive exam for the entire course (Modules 1-6, Chapters 1-11 of Textbook). The test will be closed-book, but a review formula sheet will be allowed.

- ***No makeup exams or quizzes will be given unless prior approval and arrangement for the makeup exam have been granted by the instructor for university allowed excuses***.

- Course Grading Scale:
  93-100(A), 90-92(A-), 87-89(B+), 83-86(B), 80-82(B-), 77-79(C+), 73-76(C), 70-72(C-), 67-69(D+), 63-66(D), 60-62(D-), 0-59(F)

Attendance: Attendance of the lectures is required. Students will not earn credit for work missed due to an absence.

Academic Honesty: Penalties for cheating on exams, submitting the work of others as your own, or allowing others to submit your work as their own will range from a grade of zero on the exam/assignment, failing the course, up to expulsion from the University, in accordance with the published university policy available at:
http://www.ohio.edu/communitystandards/ academic/index.cfm .

Collaboration: With the exception of exams, students are encouraged to collaborate with one another in learning, including working on homework assignments. However, direct plagiarism will be considered a form of academic dishonesty. It is each student's responsibility to proactively protect their work from duplication by others. All individuals involved in submitting an identical work will receive a zero-grade for that assignment or fail the course if it is a proctored test. Please review Ohio University's full definition of academic misconduct and the associated penalties at:
http://www.ohio.edu/communitystandards/academic/index.cfm

Generative AI (Chat GPT, etc.) Policy The use of Generative AI should be seen as a tool to enhance academic research, not as a replacement for critical thinking and originality in assignments. Students are not permitted to submit assignments that have been fully or partially generated by AI unless explicitly stated in the assignment instructions. All work submitted must be the original work of the student. Any ideas garnered from Generative AI research must be acknowledged with proper in-text citation and reference. Students may be asked to save the AI chat as a PDF file for verification.

Students with Disabilities: Students who may need an accommodation based on the impact of a disability should contact the class instructor privately to discuss the student's specific needs and provide written documentation from the Office of Student Accessibility Services. If the student is not yet registered as a student with a disability, s/he should contact the Office of Student Accessibility Services at 740-593-2620 or visit the office in 348 Baker University Center.

Duty to Report Sexual Misconduct:	All Ohio faculty and staff share in the responsibility to create a safe learning and working environment. As members of the campus community, any faculty and/or staff person (other than designated confidential resources) who receives a report of sexual misconduct or observes or learns of conduct that is reasonably believed to be sexual misconduct is ***required to report*** the conduct to the Office of University Equity & Civil Rights Compliance (ECRC). If a student would prefer to share information about sexual misconduct with a confidential and professional university personnel, a list of those individuals can be found at the following web address: https://www.ohio.edu/equity-civil-rights/confidential .
Religious Accommodation:	In addition to participation/attendance/absence policies already listed, students may be absent for up to three (3) days each academic semester, without penalty, to take time off for reasons of faith or religious or spiritual belief system or to participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization. Students/You are required to notify the instructor/me in writing of specific dates requested for alternative accommodations no later than fourteen (14) days after the first day of instruction. These requests will remain confidential. For more information about this policy, students/you may contact the Director and Title IX Coordinator, Equity and Civil Rights Compliance, Lindley Hall, 006, 740-593-9140, Equity@ohio.edu .
Adverse Events:	Any events or emergencies that impact regular operation of Ohio University and/or its facilities may require adjustments to the schedule, policies, and/or procedures set forth in this syllabus.

Course outcomes mapped onto student outcomes:

Student Outcome 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

- Students will be able to develop mathematical models of physical systems in both time and frequency domains.
- Students will be able to analyze the stability of feedback control systems using several methods.
- Students will be able to analyze the transient response performance of feedback control systems using several methods.
- Students will be able to analyze the steady-state error performance of feedback control systems.
- Students will be able to design feedback control systems that meet specified performance criteria.
- Students will be able to use engineering software to aid in the analysis, design, and evaluation of feedback control systems.