ME 655 - 002 Modern Control Methods Spring 2024

| | | |
|---|---|---|
| Instructor: Dr. Zhiming Ji | Office: MEC 318 | Phone/Email: 973-596-3341/ji@njit.edu |
| Class Room: KUPF 117 | Class Time: T11:30-2:20pm | Office Hours: T2:30-4:30pm & appointment |

**Required Background**: Dynamic system modeling and analysis, Laplace transforms, block diagrams, and transfer functions.

**Textbook**: Modern Control Systems (13th Ed.), by Richard C. Dorf and Robert H. Bishop, Pearson, 2016, ISBN 0134407628. [Several "US" and "International" editions exist and the problems differ among them. You may use a different edition, but you will have to obtain the correct problems from the edition with this ISBN].

**Software**: MATLAB with Control Toolbox

**Grading**: Homework 30%, midterm exam 35%, final exam 35%

**Make-Up Exams:** If you have a reason for missing an exam, you must contact the office of the Dean of Students. A make-up exam will be arranged after receiving a notice from the Dean of Students office.

**Academic Integrity** is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: *NJIT Academic Integrity Code*.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at *dos@njit.edu*.

**COURSE OUTLINE:**

| Week (date) | Topic | Reading Assignment |
|---|---|---|
| 1 (1/16) | Review: System Dynamics and Modeling | Chap. 1 |
| 2 (1/23) | MATLAB & Control Toolbox | Chap. 2 |
| 3 (1/30) | Block Diagrams & Signal Flow Graph | Chap. 2 |
| 4 (2/6) | State Variable Models | Chap. 3 |
| 5 (2/13) | Control System Characteristics | Chap. 4 |
| 6 (2/20) | Measures of Performance | Chap. 5 |
| 7 (2/27) | Stability, Root Locus Method | Chap. 6, 7 |
| 8 (3/5) | Midterm | |
| 9 (3/19) | Root Locus Method | Chap. 7 |
| 10 (3/26) | Frequency Response & Bode Diagram | Chap. 8 |
| 11 (4/2) | Bode Diagram | Chap. 8, 9 |
| 12 (4/9) | Stability: Nyquist Criterion | Chap. 9 |
| 13 (4/16) | Nichols Chart | Chap. 9 |
| 14 (4/23) | Review, Compensator, Controllability & Observability | |
| 15 (5/?) | Final Exam | |

Note: Tuesday, April 30, follows Friday Schedule.