MEEN 3230 – Systems, Dynamics, and Controls
Spring 2020

Course Description: Basic modeling techniques of the dynamic behavior of mechanical and electro-mechanical systems. Linear dynamics, block diagrams, feedback compensation, and computer simulations of steady-state and dynamic behavior. 3 hours.

Prerequisite(s): MATH 3410 or MATH 2700, ENGR 2302

Class Schedule: Section 001: M & W 12:30 pm to 1:50 pm, Classroom: B190
Section 002: T & TH 5:30 pm to 6:50 pm, Classroom: B190

Required Text: Control Systems Engineering, 7th Ed., N. Nise

Required Tools: 1. Laptop with MATLAB (2019a/b) including the following add-ons:
   Symbolic Math Toolbox, Control Systems Toolbox, Simulink, and Simscape
2. Non-programmable calculator

Supplementary Text: MATLAB – A Practical Introduction to Programming & Problem Solving, 5th Ed., S. Attaway

Analysis and Design of Control Systems Using MATLAB, 2nd Ed., R. Dukkipati

Course Objectives: 1. Model systems in the frequency domain using transfer functions.
2. Model systems in the time domain using state-space representations.
3. Analyze the time response of systems.
4. Perform reductions of multiple subsystems (block diagrams).
5. Analyze the stability of feedback systems using Routh-Hurwitz criterion.
6. Analyze the steady-state error of feedback systems.
7. Perform computer simulations of control systems.

ABET Criteria: MEEN 3230 addresses the following ABET program outcomes:
An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Instructor: Alex Hakimi
Email: alex.hakimi@unt.edu | Phone: 940-565-2400
Office & Hours: F102G, T & Th 4:00 pm to 5:00 pm
Canvas: All lecture notes and assignments will be posted in Canvas. You are responsible for checking Canvas on a routine basis. Announcements will frequently be posted in Canvas regarding homework assignments, quizzes, exams, etc. Additionally, your grades will also be posted in Canvas. If there is a discrepancy between the grade posted and the grade earned, let the TA know as soon as possible.

Lectures: Lecture note outlines are provided on Canvas. The notes should be printed and brought to lecture. **You are expected to attend every lecture to obtain interactive lecture notes.**

Homework: Homework will be assigned on a weekly basis and consist of the following:

1. A set of practice problems corresponding to the lecture notes and textbook material. These problems will not be collected or graded, however, there will be a quiz based on the material.

2. A set of assigned problems or a mini-project to be submitted via Canvas. This part of the assignment will be graded. You are responsible for checking the due date of each assignment and submitting it on time.

**Important:** Late homework will not be accepted. No make-up assignments will be given. Homework emailed to the instructor or TA will not be accepted. There are absolutely no exceptions to any of these policies.

To succeed in this course, students should complete each assignment independently and have a strong understanding of the material presented in lecture. See the “Solutions Manual” and “Academic Dishonesty” sections below.

Quizzes: A pop quiz will occasionally be given during class time. Each quiz will consist of one or two problems similar to the assigned problems or an example presented during lecture. Only a pen/pencil and a non-programmable calculator is permitted on the desk. **There are no make-ups for in-class quizzes.** See “Academic Dishonesty” section below.

Exams: On exam days, seating will be randomly assigned by the instructor. All bags and smart devices must be placed at the front of the room. Only a pen/pencil and a non-programmable calculator is permitted at the desk. **Make-up exams will be permitted only for situations approved by the Dean of Students.** See “Academic Dishonesty” section below.

Grade Evaluation: | A: 90-100% | B: 80-89% | C: 70-79% | D: 60-69% | F: < 60% |
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Re-Grades: Any requests for exam and quiz re-grades must be made the day it is returned. Once class is over, re-grade requests will not be accepted. It should be noted that the entire exam or quiz will be re-graded. This may result in a score lower than previously assigned.
Academic Dishonesty: Students are expected to do their own work on assignments. If it is determined that students are copying each other’s work or copying from the solutions manual, a score of zero will be given for that assignment.

If it is determined that a student is talking during a quiz/exam, copying off of other students’ papers, sharing an equation sheet, etc., a score of zero will be given for that quiz/exam.

Use of smart devices (phones, watches, tablets, laptops, headphones, etc.) is strictly prohibited during a quiz/exam. If a student is caught using any of these devices, a score of zero will be given for that quiz/exam.

If a student is suspected of violating any of the policies above, they will be reported to the Academic Integrity Office. Two violations will result in an automatic F for the course. There are no exceptions to any of the policies in this section.

Solutions Manual: It is common knowledge that solutions manuals to all widely-used textbooks are available online. Please use these resources in the correct way. Going directly to the solutions manual is not beneficial to you, in fact, it is detrimental to your grade.

To use these resources properly, you should: 1. Attempt the problem on your own. 2. Continue working on the problem if you get stuck. Utilize the textbook, lecture notes, or online material to obtain a solution. 3. Compare your solution with the solutions manual. If mistakes have been made, make sure you understand why and learn how to fix them.

Your goal in doing the practice problems is learning how to apply the material learned in class to a variety of problems. The only way to do this is to work through problems on your own.

Disability Policy: All reasonable accommodations will be made to facilitate special needs. If special accommodations are required, the student must first meet with the staff of the Office of Disability Accommodation (ODA), (940) 565-4323. After meeting with that office, please contact me to discuss what accommodations will be necessary.

For more information, see http://www.unt.edu/oda