MEEN 3230 – Systems, Dynamics, and Control
Fall 2020

Instructor: Alex Hakimi
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Office & Hours: Remote (via Zoom), M & W 3:30 pm to 4:30 pm
Note: Email to schedule a meeting time during office hours.

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: T & TH 2:30 pm to 3:50 pm, Classroom: Remote (Online)

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

Required Tools:
1. MATLAB (2020a or 2019a/b) including the following add-ons:
   Symbolic Math Toolbox, Control Systems Toolbox, Simulink, and Simscape
2. PDF scanner application e.g. Adobe Scan, Genius Scan, etc.
3. Respondus Lockdown Browser for laptop/desktop
4. Webcam for laptop/desktop
5. Non-programmable calculator

Recommended Tools: Digital writing interface (tablet and pen) e.g. Surface, iPad, Two-in-One, Wacom, etc.

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


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.

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. You are expected to view/watch every lecture to complete the lecture notes as well as obtain key information. Lectures will be given in real-time (live) via Zoom and uploaded to Canvas for subsequent viewings. You are strongly encouraged to participate in the live lectures by asking and responding to questions. Class participation is highly beneficial to you and as well as fellow classmates.

Class recordings are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.

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 quizzes based on the material.
2. A set of assigned problems corresponding to interactive lectures to be submitted via Canvas. The majority of these problems will require MATLAB. 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 simple problems similar to the assigned problems or an example presented during lecture. Quizzes will be submitted via Canvas during lecture.

There are no make-ups for in-class quizzes. See “Academic Dishonesty” section below.

Project: A group-based project will be assigned near the midpoint of the semester. The project will require an application of course material and design tools. It will provide students with an opportunity to employ the fundamentals of Systems, Dynamics, and Control in an area that interests them. Students will present and submit their projects near the end of the semester.

Exams: Exams will be taken with Respondus Lockdown Browser with Webcam Monitoring. 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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<tr>
<th>Component</th>
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<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
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<td>Quizzes</td>
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<td>Project</td>
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<td>Exam 1</td>
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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 the work of others, copying each other’s work, or copying from solutions, a score of zero will be given for that assignment.

If it is determined that students are communicating in any way during a quiz or exam, a score of zero will be given for that quiz or exam.

Use of smart devices to access prohibited resources is strictly prohibited during a quiz or exam. If a student is caught using any of these devices, a score of zero will be given for that quiz or 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 to homework problems 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, and online resources 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