UTTyler ENGINEERING

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MENG 4312 – System Dynamics and Control
Course Syllabus

Semester / Year	Fall 2023
Catalog Description	Dynamics of mechanical, electrical, thermal, fluid, and hybrid systems. System response using Laplace transform. Transfer functions. Transient response, Stability, Basic control algorithms, PID tuning methods, Frequency response, basic controller design and case studies.
Prerequisites	**MENG 3309, MENG 3211, and MENG 3316, and C or better in EENG 3304 (Linear Circuits Analysis) or equivalent like ENGR 2405**
Section Number	031
Instructor Name	Dr. M. A. Rafe Biswas
Contact Information	Email: mbiswas@uttyler.edu Zoom ID & Phone: 903 566 6115 Office: HEC A214
Class Type / Instruction Mode / Location	Face-to-Face Lecture Houston Engineering Ctr B210 (details posted on Canvas)
Class Time	MW 5:00 – 6:25 PM
Office Hours	MW: 2:30 PM – 4:00 PM, or By appointment
No. of Credits	3
Required Textbook	Katsuhiko Ogata, System Dynamics, 4th Ed., Prentice Hall, 2003, but older editions are acceptable https://uttyler.bncollege.com/c/System-Dynamics/p/MBS_588545_new?currentCampus=782&currentTerm=782_1_22_F&currentCourse=782_1_22_F_200_4312_3
Optional References	Recommended online textbook (available *via* library using patriots account) – - Mandal, Ajit K.. *Introduction to Control Engineering : Modeling, Analysis and Design*, New Age International Ltd, 2006. *ProQuest Ebook Central*, https://ebookcentral.proquest.com/lib/uttyler/detail.action?docID=395560 - Lobontiu, Nicolae. *System dynamics for engineering students: Concepts and applications*. Academic Press, 2017. (Elsevier website: https://www.sciencedirect.com/book/9780128045596/system-dynamics-for-engineering-students) Additional Material on Canvas: Websites, Class Handouts, Tutorials on MATLAB and Simulink by Mathworks, Inc.
Additional Rules and Requirements	MATLAB, Simulink & Simscape by MathWorks, Inc. (available through virtual desktop – one.uttyler.edu and IT support)

	The use of cellular phones during the lectures is prohibited. If a student uses the cellular phone (call, text, internet), he/she will be asked to leave the classroom and penalties of missing the class will apply. It is highly recommended to keep your cellular phone off.
Evaluation Method	Exam 30% Assignments, Class Participation and Conduct 30% Project 40%
Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60
Important Events / Dates	Census date: September 1 Last date to withdraw from one or more 15-week courses: October 30 Final Project Report: November 30 Exam 3: Finals week (week of December 3)
Attendance / Makeup policy / other rules	Attendance is expected per university policy. Attendance of lectures may be regularly checked using Canvas. Make-up exams or assignments if approved will be administered during finals week. No email submission of assignment(s). All assignments MUST be submitted to Canvas for grading. Student with SAR status should contact the UT Tyler Office of Student Accessibility and Resources for exam arrangements. Any minor violation of the Student Behavior by a student will result in a full letter grade reduction for each incident and any single major violation such as cheating and plagiarism by a student will result in automatic failing grading in the course. Late submissions of assignments, lab reports (e.g., if due at 11:59:00 pm, then any time after such as 11:59:30 pm is late) will result in 10 % deduction per day from the graded score until down to 10% remaining. Late or no submission for any exam results in automatic grade of zero. Questions involving knowledge covered in class will be answered if the student proves that they have tried to come up with the answer. Solution to homework and quizzes will not be given. However, students can work on the right solution by checking their work with the instructor. Grade appeal: grades can be appealed by sending a Canvas message in written or typed format and then meeting the instructor during office hours, but no later than a week after the grade has been posted. Moreover, students may appeal any grade reduction to the instructor if valid excuse with documentation is provided. Note: your final semester grade is based on the 10-point scale. No curving or scaling will be applied even if you receive borderline grade such as 79.99.

Course Learning Objectives / ABET & PEOs Relation	By the end of this course, students will be able to: 1. Apply fundamental principles of dynamic systems to modeling. 2. Analyze dynamics systems in time domain and frequency domain. 3. Conduct the analysis and design of SISO control systems. 4. Use computational tools to assist in the design and analysis of dynamics systems and pertinent controllers. 5. Apply control system knowledge to real-world problems in case studies.
Tentative Topics / Course Plans	• Transfer-function modeling approach • State-space modeling approach • Time domain analysis of dynamic systems • Frequency domain analysis of dynamics systems • Time domain control design • Frequency domain control design • Self-directed project investigation.
University Policies	https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf