Course Syllabus – Spring 26

Course Modality and Expectations

Instructional Mode	Traditional.
Course Platform	Lecture slides and assignments/assessments will be posted on eLearning. Class will meet face to face. Office hours will be in person or through MS Teams phone call.
Expectations	Students are expected to access the course from eLearning and complete assigned activities weekly.
Student Resources	A variety of resources are available to help students to obtain counseling, health care, and academic support.

Course Information

Course Number/Section EE 4310-002
Course Title Systems and Controls
Term Spring 2026

***Days & Times*:**

Lectures: Tuesdays/Thursdays: 1:00 pm-2:15 pm

Census date: Wed. Feb. 4 Drop date: Wed. April 8.
Midterm grade: Sat. March 14. Last Day of classes: Friday, May 8.

Professor Contact Information

Professor Rabah Mezenner, PhD
Office Phone 972-883-6871
Email Address rabah.mezenner@utdallas.edu
Office Location ECSN 3.920
Office Hours Mondays/Wednesdays: 2:30 pm - 4:30 pm FF or MS Teams calls.
Tuesdays/Thursdays: 4:30 pm - 5:30 pm FF or MS Teams calls.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

ENGR 2300 and EE 3302.

Students must be capable of accessing the course on eLearning and submit assignments and assessments online IN and/or OUT of class time.

Course Description

EE 4310 Systems and Controls (3 semester credit hours) Introduction to linear control theory. General structure of control systems. Mathematical models including differential equations, transfer functions, and state space. Control system characteristics. Transient response, external disturbance, and steady-state error. Control system analysis. Performance, stability, root-locus method, Bode diagram, and Nyquist plot. Control system design. Compensation design using phase-lead and phase-lag networks.

Prerequisites: ENGR 2300, and EE 3302. (3-0) S

Student Learning Objectives/Outcomes

1. Ability to sketch a root locus plot and use it to analyze system performance.
2. Ability to sketch a Bode plot to determine gain and phase margins and design compensator networks.
3. Ability to derive a system transfer function or state space from physical models and analyze stability and performance of closed-loop systems.
4. Demonstrate the ability to acquire and understand reliable literature related to systems and controls.

Required Textbooks and Materials

Control Systems Engineering (zyVersion), by Norman S. Nise.

1. Click on the zyBooks link in the Lectures and Activities folder in the Course Homepage on eLearning.
2. Follow the instructions to create an account, if needed, and subscribe.

(Do not go to the zyBooks website and create a new account)

Other materials as posted on eLearning

Supplemental Course Materials

Feedback Control of Dynamic Systems (8th Edition), by Franklin, Powell and Emani-Naeini.

Course schedule :
The topics, descriptions, and timelines are subject to change at the discretion of the professor. Always refer to the syllabus posted for updates and to the assignments and assessments on eLearning for the due dates.

WEEK # starting	**Topic/Lecture**	**Participation Activities**	**Assignments and assessments**
1 Jan. 19	Introduction, course layout & syllabus Chapter 1: Introduction to control systems Chapter 2: Modeling in frequency domain Sections 2.1 and 2.2: Laplace Transform	PA chap. 1	Quiz 1
2 Jan. 26	Sections 2.3, 2.4 Transfer function and Modeling Electrical Networks 2.5, 2.6: Modeling Electrical and Mechanical systems	PA chap. 2	Quiz 2
3 Feb. 2	Chap. 3: Modeling in time domain 3.1 – 3.3 State space representation 3.4-3.6: State Space/Transfer function conversions	PA chap. 3	Quiz 3 HMWK 1 (chap. 2, 3)
4 Feb. 09	Chap. 4: Time/Dynamic response 4.1-4.3: Poles and zeros, First order systems 4.4-4.5: Second order systems	PA chap. 4 Group Activity 1 (chap. 2-6)	Quiz 4
5 Feb. 16	4.6-4.8: Second order systems with zeros and additional poles Chap. 5: Block Diagrams and system reduction (5.1-5.3)	PA chap. 5	HMWK 2 (chap. 4, 5) Quiz
6 Feb. 24	Chap. 6: Stability 6.1-6.2: RH criteria 6.3, 6.4 Stability Examples	PA chap. 6	Quiz 6
7 Mar. 2	Chap. 7: Steady-State Errors 7.1-7.3 Steady-state error for unity-feedback systems, Static error constants, and system type 7.4 Steady-state error specifications	PA chap. 7	**Exam 1: 03/05-07**
8 Mar. 09	7.5 Steady-state error for disturbances 7.6 Steady-state error for non-unity-feedback systems. 7.7 Sensitivity 8. Root Locus Techniques 8.1-8.3: Definition and properties	PA chap. 8	Quiz 7 HMWK 3 (chap. 6, 7)
9 Mar. 16	Spring Break		

WEEK # starting	**Topic/Lecture**	**Participation Activities**	**Assignments and assessments**
10 Mar. 23	8.4-8.6 Sketching the root locus and examples 8.7-8.8: Transient response design via gain adjustment and generalized root locus	Group Activity 2 (chap 7-11)	Quiz 8
11 Mar. 30	8.9, 8.10: Root locus for positive-feedback systems and Pole sensitivity Chap. 9 Design via Root Locus 9.1-9.3: Improving steady-state error and transient response via cascade compensation	PA chap. 9	Quiz 9
12 Apr. 6	9.4,9.6 Improving steady-state error and transient response. Physical realization of compensation Chap. 10. Frequency Response Techniques 10.1-10.3: Asymptotic approximations: Bode plots	PA chap. 10a	HMWK 4 (chap. 8, 9) Quiz 10a
13 Apr. 13	10.4,10.5: Introduction to the Nyquist criterion and sketching the Nyquist diagram 10.6, 10.7: Stability via the Nyquist diagram and Gain margin and phase margin via the Nyquist diagram		**Exam 2: 04/17-19**
14 Apr. 20	10.8, 10.9: Stability, gain margin, and phase margin via Bode plots and relation between closed-loop transient and closed-loop frequency responses 10.10, 10.11: Relation between closed- and open-loop frequency responses and relation between closed-loop transient and open-loop frequency responses	PA chap. 10b	Quiz 10b HMWK 5 (chap. 10)
15 Apr. 27	10.12, 10.13: Steady-state error characteristics from frequency response and systems with time delay 10.14 Obtaining transfer functions experimentally 11.2 Design transient response via gain adjustment	PA chap. 11	Quiz 11
16 May 4	11.3 Lag compensation 11.4 Lead compensation 11.5 Lag-lead compensation		**Exam 3: 05/08-12**
17 May 11	Final's week		**Exam 3: 05/08-12**
18 May 16	Course grades posted		

Grading Policy

Group Activities 4% Quizzes 10%. HMWKs. 35%
Exams (3x 17%). 51%

Course & Instructor Policies

Make-up exams

No make-up exams will be allowed except for a documented extended medical condition or family emergency. University policy will be adhered to regarding absences due to illness, religious holidays, etc. Planned absences should be communicated to the instructor as soon as possible.

The University of Texas at Dallas is committed to providing reasonable accommodation for all people with disabilities. The syllabus is available in alternate formats upon request. If you are seeking classroom accommodations under the Americans with Disabilities Act (2008), you are required to register with the AccessAbility Resource Center, located in the Administration Building (AD), Suite 2.224. Their phone number is 972-883-2098, email: accessability@utdallas.edu and website is https://accessability.utdallas.edu(opens in a new tab) . To receive academic accommodations for this class, please obtain the proper AccessAbility Resource Center letter of accommodation and meet with me at the beginning of the semester.

No accommodation will be given without approval from ARC and a timely discussion with the instructor.

Extra Credit

There is no extra credit assignment. There will be bonus opportunities available weekly for a limited time to encourage attendance and/or reading activities. They will be added to the exam scores and may add up to 3+ points to your course grade. Additionally, the course evaluation bonus will be used to round up the course grade to the nearest whole number.

Late Work

Late homeworks are accepted up to three days after the due date with a late penalty of up to 30 points. There is no grace period for quizzes.

Class Participation

Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly invite scholastic difficulty. **I expect students to be engaged during class and to actively participate in the activities both in and outside of class sessions. Additionally, there will be two group activities where students are expected to collaborate on researching and summarizing the material in assigned sections.**

Successful participation is defined as consistently adhering to university requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. **Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments** except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class, as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, they are for the exclusive use of registered students**. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments** except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students.

Please go to Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to UT Dallas Syllabus Policies webpage for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.