

MECE 3338: Dynamics & Control of Mechanical Systems Fall 2024

Class Sections	Days and Times	Room	Instructional Mode
MECE 3338 (13251)	MoWe 2:30pm-4:00pm	D3 W122	Face-to-face

Instructor: Marzia Cescon

Office Room: Room W-206, Engineering Building 2

Office Hours: Monday 1:00-2:00 pm (please send email).

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Important Note

This whole syllabus document is important, and should be read in its entirety.

Syllabus Changes

Please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible through Canvas.

Title IX/Sexual Misconduct

Per the UHS Sexual Misconduct Policy, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and state law and must report incidents of sexual misconduct (sexual harassment, non-consensual sexual contact, sexual assault, sexual exploitation, sexual intimidation, intimate partner violence, or stalking) about which they become aware to the Title IX office. Please know there are places on campus where you can make a report in confidence. You can find more information about resources on the Title IX website at <https://uh.edu/equal-opportunity/title-ix-sexual-misconduct/resources/>.

Reasonable Academic Adjustments/Auxiliary Aids

The University of Houston is committed to providing an academic environment and educational programs that are accessible for its students. Any student with a disability who is experiencing barriers to learning, assessment or participation is encouraged to contact the Justin Dart, Jr. Student Accessibility Center (Dart Center) to learn more about academic accommodations and support that may be available to them. Students seeking academic accommodations will need to register with the Dart Center as soon as possible to ensure timely implementation of approved accommodations. Please contact the Dart Center by visiting the website: <https://uh.edu/accessibility/> calling (713) 743-5400, or emailing jdcenter@Central.UH.EDU.

The [Student Health Center](#) offers a Psychiatry Clinic for enrolled UH students. Call 713-743-5149 during clinic hours, Monday through Friday 8 a.m. - 4:30 p.m. to schedule an appointment.

The [A.D. Bruce Religion Center](#) offers spiritual support and a variety of programs centered on well-being.

The [Center for Student Advocacy and Community \(CSAC\)](#) is where you can go if you need help but don't know where to start. CSAC is a “home away from home” and serves as a [resource hub](#) to help you get the resources needed to support academic and personal success. Through our [Cougar Cupboard](#), all students can get up to 30 lbs of FREE groceries a week. Additionally, we provide 1:1 appointments to get you connected to on- and off-campus resources related to essential needs, safety and advocacy, and more. The [Cougar Closet](#) is a registered student organization advised by our office and

Note. Information contained in this syllabus is subject to change without notice. The instructor holds the right to make amendments to course assignments and due dates. Students are expected to be aware of any additional course policies presented by the instructor during the course.

offers free clothes to students so that all Coogs can feel good in their fit. We also host a series of cultural and community-based events that fosters social connection and helps the cougar community come closer together. Visit the CSAC homepage or follow us on Instagram: @uh_CSAC and @uhcupbrd. YOU belong here.

Women and Gender Resource Center

The mission of the [WGRC](#) is to advance the University of Houston and promote the success of all students, faculty, and staff through educating, empowering, and supporting the UH community. The WGRC suite is open to you. Stop by the office for a study space, to take a break, grab a snack, or check out one of the WGRC programs or resources. Stop by Student Center South room B12 (Basement floor near Starbucks and down the hall from Creation Station) from 9 am to 5 pm Monday through Friday.

Academic Honesty Policy

High ethical standards are critical to the integrity of any institution, and bear directly on the ultimate value of conferred degrees. All UH community members are expected to contribute to an atmosphere of the highest possible ethical standards. Maintaining such an atmosphere requires that any instances of academic dishonesty be recognized and addressed. The [UH Academic Honesty Policy](#) is designed to handle those instances with fairness to all parties involved: the students, the instructors, and the University itself. All students and faculty of the University of Houston are responsible for being familiar with this policy.

Excused Absence Policy

Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston [Undergraduate Excused Absence Policy](#) and [Graduate Excused Absence Policy](#) for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to [military service](#), [religious holy days, pregnancy and related conditions](#), and [disability](#).

Recording of Class

Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the [Justin Dart, Jr. Student Accessibility Center](#). If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with anyone without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

Resources for Online Learning

The University of Houston is committed to student success, and provides information to optimize the online learning experience through our [Power-On](#) website. Please visit this website for a comprehensive set of resources, tools, and tips including: obtaining access to the internet, AccessUH, Blackboard, and Canvas; using your smartphone as a webcam; and downloading Microsoft Office 365 at no cost. For questions or assistance contact UHOnline@uh.edu.

UH Email

Please check and use your Cougarnet email for communications related to this course. Faculty use the Cougarnet email to respond to course-related inquiries such as grade queries or progress reports for reasons of FERPA. To access your

Cougarnet email, [login](#) to your Microsoft 365 account with your Cougarnet credentials. Visit [University Information Technology \(UIT\)](#) for instructions on how to connect your Cougarnet e-mail on a mobile device.

Security Escorts and Cougar Ride

UHPD continually works with the University community to make the campus a safe place to learn, work, and live. The security escort service is designed for the community members who have safety concerns and would like to have a Security Officer walk with them, for their safety, as they make their way across campus. Based on availability either a UHPD Security Officer or Police Officer will escort students, faculty, and staff to locations beginning and ending on campus. If you feel that you need a Security Officer to walk with you for your safety, please call [713-743-3333](tel:713-743-3333). Arrangements may be made for special needs.

Parking and Transportation Services also offers a late-night, on-demand shuttle service called “Cougar Ride” that provides rides to and from all on-campus shuttle stops, as well as the MD Anderson Library, Cougar Village/Moody Towers and the UH Technology Bridge. Rides can be requested through the UH Go app. Days and hours of operation can be found at <https://uh.edu/af-university-services/parking/cougar-ride/>.

Mental Health and Wellness Resources

The University of Houston has a number of resources to support students’ mental health and overall wellness, including [CoogsCARE](#) and the [UH Go App](#). UH [Counseling and Psychological Services \(CAPS\)](#) offers 24/7 mental health support for all students, addressing various concerns like stress, college adjustment and sadness. CAPS provides individual and couples counseling, group therapy, workshops and connections to other support services on and off-campus. For assistance visit uh.edu/caps, call 713-743-5454, or visit a [Let’s Talk](#) location in-person or virtually. [Let’s Talk](#) are daily, informal confidential consultations with CAPS therapists where no appointment or paperwork is needed.

Need Support Now?

If you or someone you know is struggling or in crisis, help is available. Call CAPS crisis support 24/7 at 713-743-5454, or the National Suicide and Crisis Lifeline: call or text [988](tel:988), or chat 988lifeline.org.

Course Description

Learning Objectives and Outcomes:

Engineering accreditation learning objectives that this course covers are:

- Students will learn to identify, formulate, and solve engineering problems (ABET outcome E)
- Students will learn to apply knowledge of mathematics (ABET learning outcome A)
- Student will learn to design a system, component, or process to meet desired needs (ABET outcome C)

Textbook and Materials: The recommended (optional) textbook for the course is: “**K. Ogata, System Dynamics, Fourth Edition, Prentice Hall.**” However, distributed course notes will cover all the course material.

Course Prerequisites: The prerequisites for this course are: (i) MECE 2361 Mechanical Design I and (ii) MECE 3336 Mechanics II. The course requires strong background knowledge of differential equations, engineering statics, kinematics and dynamics, complex variables, and Laplace transforms. Prior working knowledge of MATLAB is desirable.

Recommended Preparation: SharePoint page linked below contains a pre-req review for this class:

[MECE 3338 - Get Ahead!](#)

Course Outline and Topics

The course will cover the modelling and analysis of mechanical systems, transfer functions, 1st and 2nd order system response, design of system parameters to satisfy transient and steady-state response specifications for mechanical systems, time and frequency response specifications, introduction to electrical systems, vibration isolation, and feedback controller gain design to meet closed-loop response specifications.

Specific topics to be covered include:

- Modeling of mechanical components and systems
- Differential equations of motion of single and multi-degree-of freedom (DOF) systems
- Gear and transmission systems
- Free and forced response of single and multi-DOF systems
- Laplace transform methods
- Transfer functions of systems
- 1st and 2nd order system response
- Time response, stability, and performance specifications
- System design using time response methods
- Modeling of electrical components and systems
- Electromechanical systems
- Frequency response methods and Bode diagrams
- System design using frequency response methods
- Vibration isolation and vibration absorbers
- Block diagrams and system component interconnections
- Closed-loop system response
- Control design to satisfy time and frequency response specifications
- P, PI, PD and PID controllers

Assessment Details and Grading

There will be weekly assignments, frequent unannounced quizzes, two semester midterms and a comprehensive final exam. They will count toward the final grade as follows.

Homework	5%
Quizzes	10%
Midterm 1	25%
Midterm 2	25%
Final	35%

The instructor may adjust this at the end of the semester, based on their judgment of how the class has performed over the course of the semester.

Weekly Homework

There will be homework assigned almost every week. Homework will be posted on Canvas every Wednesday and the due date will always be midnight of the Wednesday of the following week. The homework are meant to reinforce the lecture content of the current week, i.e., in any given week, the course content covered on Monday and Wednesday will be homeworked on during the rest of that week, and will be due the following Wednesday. This does lead to a fast pace of assignments, and a substantial commitment of study over the weekend, but all this is meant to reinforce the ongoing

learning modules, and to make sure that students keep pace with the instructor. There is no benefit from copying or rephrasing solutions from another source. You will get the most benefit by reading and trying them on your own before they are discussed with classmates or with the TA/ instructor or solved during a lecture.

Assignments are expected to be turned into Canvas by the assigned due date. Technology failures will not be accepted as reason for missed assignment due dates. Therefore, do not leave anything to the last minute. Back up files frequently and in various locations so work is not lost. It is the student's responsibility to identify alternative ways to complete or submit an assignment. For example, if the Canvas system (elearning.uh.edu) is offline consider emailing the assignment before the due date. Students are required to follow all [UH deadlines](http://uh.edu/academics/catalog/academic-calendar) (uh.edu/academics/catalog/academic-calendar). All problems assigned need to be attempted to receive a non-zero grade. Only selected problems will count toward the homework grade. Homework will be self-graded using provided solutions. Grade will be assigned based on the accuracy and completeness of the self-graded submission.

Quizzes

There will be frequent in class quizzes to practice recently covered material.

Exams

All exams will be closed notes and closed books. They will take place **in-class** as follows:

Exam 1: Wednesday September 25th, 2024, 2:30 PM – 4:00 PM
Exam 2: Monday November 4th, 2024, 2:30 PM – 4:00 PM
Final Exam: Wednesday December 4th, 2023, 2:00 PM – 4:00 PM

Make-up Policy

For homework assignments, late submissions are not accepted. They earn a score of zero.

There will be no make-up tests for the midterms. For very valid, documented and verifiable reasons, if a student is not able to take either of the midterms, then a special accommodation will be made on a case-by-case basis in which the final exam will count for extra weightage. Students need to contact the instructor as soon as possible if an emergency arises.

The final exam is mandatory. If an emergency arises and the final exam is missed, then, on a case-by-case basis, there will either be a make-up test or else an Incomplete ("I") grade will be assigned. The "I" grade could mean that final exam will need to be taken with the final test in the subsequent semester, unless other special arrangements are made with the instructor.

Materials in this course may be protected by copyright and should not be redistributed. Visit the [UH Library Copyright Resources](http://guides.lib.uh.edu/copyright) (guides.lib.uh.edu/copyright) for support resources regarding the basics of copyright, tools, fair use, and copyright law.

Emergency Preparedness Information

Emergency Phone Numbers

713-743-3333 UH Police
911 Emergency Dispatch

Security Escort

The Security escort service is designed for the community members who have safety concerns and would like to have a Security Officer walk with them, for their safety, as they make their way across campus. Call **713-743-3333** to make arrangements.

FIRE

Evacuate

- > If the fire alarm is not sounding, activate the nearest alarm pull station.
- > Call **713-743-3333** or **911** to report the fire.
- > Notify and assist people in the immediate area.
- > As you leave, close all doors behind you to limit the movement of smoke or flames.
- > Do not re-enter the building until authorized to do so by emergency personnel.
- > Never assume an alarm is false.
- > Do not use elevators.
- > If unable to exit the building, go to nearest exit stairwell or safe area of refuge and call **713-743-3333** or **911** to report your location.
- > If trained, use a fire extinguisher if the fire is small and contained, and the room is not filled with smoke.

Two emergency exits are located:

1. Farish Hall - Northwest Stairwell (A stairs)
2. Farish Hall - Southeast Stairwell (C stairs)

Primary (Near) Meeting Area:

Green space between Farish Hall and McElhinney Hall.

Secondary (Far) Meeting Area:

Green space at Ezekiel W. Cullen water fountains.

UH Alert

UHALERT

In the event of a campus emergency, the University of Houston will activate the UH ALERT Emergency Notification System to provide critical information. UH ALERT utilizes the following methods to send UH ALERTS:

- > [UH ALERT Website \(alerts.uh.edu\)](http://alerts.uh.edu)
- > Email
- > Text Message
- > [Facebook Alerts \(facebook.com/UHAlert\)](https://facebook.com/UHAlert)
- > [Twitter Alerts \(twitter.com/UHAlert\)](https://twitter.com/UHAlert)
- > [UH Mobile App \(uh.edu/go\)](http://uh.edu/go)
- > Digital Signage
- > Outdoor Warning Siren

For more information visit the UH ALERT website.

Weather

Shelter-in-Place

- > Seek shelter indoors.
- > Check uh.edu/emergency for shelter-in-place directive for the UH campus.
- > If a Tornado Warning is issued, seek shelter indoors in an interior room away from windows, and on the lowest floor possible.

Active Shooter

Avoid, Deny, Defend

If an active shooter or violent person is in your vicinity, please attempt to take the following steps:

- > **AVOID:** If possible, exit the building immediately and call **713-743-3333** to reach UH Police, or dial **911**.
- > **DENY:** If you cannot exit, clear the hallway quickly, remain behind closed doors in a locked or barricaded room, if possible, and stay away from interior windows.
- > **DEFEND:** Do not attempt to confront or apprehend the shooter, unless it is a last resort.

See http://uh.edu/police/active_shooter.html for more information about "Avoid, Deny, Defend."