

MATH 4362, THEORY OF DIFFERENTIAL EQUATIONS AND NONLINEAR DYNAMICS

Spring 2021 – Dr. Vaughn Climenhaga

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Website: www.math.uh.edu/~climinha/math4362.html, Blackboard, and Microsoft Teams

Syllabus Changes. Due to the changing nature of the COVID-19 pandemic, 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 Blackboard and email.

Prerequisites: Math 3331 (Differential Equations) or equivalent, and three additional hours of 3000-4000 level Mathematics.

Textbook: Steven H. Strogatz, “Nonlinear Dynamics and Chaos: With Applications to Physics, Biology, Chemistry, and Engineering”, second edition.

Course Description: We will study the qualitative theory of nonlinear dynamics, including stability of equilibrium points and periodic orbits, bifurcations, and elements of chaos theory.

Grading: Your final grade will be based on the following components.

- Homework: 35%. Roughly bi-weekly, with due dates announced on Blackboard. Your lowest homework score will be dropped.
- Mini-projects: 15%. Three of these, with due dates announced on Blackboard. Each one should be about the same amount of work as a regular homework assignment, but spread out over a longer period of time. All three grades will count.
- Midterm exam: 20%. Date will be announced on Blackboard.
- Final exam: 30%. Date will be announced on Blackboard.

What you will need: A computer and internet connection meeting the requirements at <https://uh.edu/online/tech/requirements/> as well as the following; see below for more details.

- Blackboard (for homework, discussion forum, gradebook, and important links).
 - Sign in via <https://accessuh.uh.edu/login.php>
- Microsoft Teams (for office hours and any other video chat).
 - Download app; there is also a possibility to join video calls in a browser.
- A way to capture your homework assignments and exams **as a pdf file**.
- A microphone and webcam for online virtual proctored exams.

Lectures and office hours:

- *Lectures:* There will be no live lectures in this course; all lectures will be pre-recorded. Links to lecture videos will be posted in Blackboard; the videos themselves will be on Microsoft Stream, which may require you to log in using your CougarNet credentials.
- *Office hours:* I will have online office hours through Microsoft Teams. The timing of these may vary through the semester; see the Blackboard page for the current schedule and a link to join the office hours. Following that link will take you to a Teams “meeting” open to anyone in this course. If you have something to discuss privately with me, use Teams to place a video call (using the “Calls” button at the left-hand side of Teams) during my office hours. Please note that I may not respond immediately if I am currently talking with another student in the office hours meeting, but will respond as soon as I am able. I will not answer video calls outside of my office hours.

- *Discussion forums:* The Blackboard page for the class has discussion forums where you can ask questions about logistics of the course, details from the video lectures, or the homework assignments. Anything you post here will be visible to all students in the class. You are encouraged to use the homework forum to discuss the homework assignments with each other and to arrange virtual study sessions (through Teams).

Webcams. Access to a webcam is required for students participating remotely in this course. Webcams must be turned on during exams to ensure the academic integrity of exam administration.

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, and Blackboard; requesting a laptop through the Laptop Loaner Program; using your smartphone as a webcam; and downloading Microsoft Office 365 at no cost. For questions or assistance contact UHOnline@uh.edu.

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 Center for Students with DisABILITIES. 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.

Drop/withdraw deadlines: The current version of the university's academic calendar at <http://www.uh.edu/academic-calendar-undergraduate> lists the following deadlines.

- Wednesday, February 3: Last day to drop a course or withdraw without receiving a grade
- Tuesday, April 6: Last day to drop a course or withdraw with a "W".

Participation and homework: You are expected to view every video lecture, and are strongly encouraged to ask questions via the discussion forum in Blackboard or during online office hours about anything I say in the lectures that is not clear to you. The tests and exams will draw on all material covered in lectures and homework. Homework assignments and mini-projects will be due as announced on Blackboard; you will submit your assignment by uploading a file to Blackboard, **which must be in pdf format.**

- *Other file formats will not be accepted.*
- *Late homeworks will not be accepted.**

Tests and exams: For online tests you will need to use a "virtual proctoring system", presumably CASA Monitor; details will be announced on Blackboard. **All tests must be completed by the announced deadline.***

Exceptions to these deadline policies may be made per the Student Academic Adjustments/Auxiliary Aids Policy for students with approved CSD accommodations, as well as for students with an official excused absence as recognized by University of Houston in accordance with federal and state law and described at <https://uh.edu/provost/policies-resources/student/excused-absence-policy/> – to seek such an exception you must contact me promptly, notify me of the situation, and provide me with documentation. This must be done **before the due date or test/exam date unless the exception is for an unforeseeable emergency. Even if we discuss the matter verbally, I will also ask you to send me information and documentation by email, in order to keep a written record.*

Excused Absence Policy. Regular class attendance, participation, and engagement in course-work 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. Additional policies address absences related to military service, religious holy days, pregnancy and related conditions, and disability.

Religious Holy Days. Students whose religious beliefs prohibit class attendance or the completion of specific assignments on designated dates may obtain an excused absence. To do so, please make a written request for an excused absence and submit it to your instructor as soon as possible, to allow the instructor to make arrangements. For more information, see the Student Handbook. <http://catalog.uh.edu/index.php>

Announcements and email communications: All course announcements will be made on the Blackboard site, which you are expected to check regularly. Some announcements may also be sent via email (using the email address recorded in the official class list, which is typically a “@uh.edu” address), but the “Information” page of the Blackboard site will be the official location for all announcements, and you are responsible for being aware of anything that is posted here.

Email communications related to this course will be sent to your Exchange email account which each University of Houston student receives. The Exchange mail server can be accessed via Outlook, which provides a single location for organizing and managing day-to-day information, from email and calendars to contacts and task lists. Exchange email accounts can be accessed by logging into Office 365 with your CougarNet credentials or through Access UH. They can also be configured on IOS and Android mobile devices. Additional assistance can be found at the Get Help page. Please also note that you are responsible for the content in emails sent to your UH account, regardless if your external (non-UH) email provider filters or blocks them.

If you need to contact me with a question or concern, you are always welcome to speak to me during my online office hours, or to email me using the address listed at the top of the syllabus to arrange a private discussion. If you email me and do not receive a response within one working day, please resend the email. If you again do not hear from me within one more working day, it is likely that your email is not coming through and you should alert me to the problem in the online office hour or by sending me a message in Blackboard/Teams. It is your responsibility to ensure that I am aware of issues you may have with the course; failure to effectively initiate timely communication is not a valid basis for a grade grievance and cannot be used as such.

Other policies: All coursework (assignments, exams, etc.) will be graded within 10 days of when it is submitted; you will receive your grades and any feedback via Blackboard. Any requests for reconsideration of grades on individual pieces of coursework must be made within 15 days of when grades are posted on Blackboard.

If you do not turn in homeworks or take exams, do not drop the class, and your name appears on the final class roll but I have not received any communication from you concerning your inability to participate in the class, you will receive a grade of F at the end of the semester. Thus **if for any reason you are unable to participate fully in this online course, it is vital that you contact me as soon as you experience difficulties.**

Academic honesty and dishonesty: You are expected to follow the Academic Honesty Policy in the Student Handbook; see <https://uh.edu/provost/policies-resources/honesty/>. In particular, the following are expected in this course.

- You are permitted and encouraged to work collaboratively with your classmates on homework assignments to discover and understand solutions – working together and teaching

each other is one of the best ways to fully learn the material. However, the final write-up of the solutions must be in your own words.

- Academic dishonesty on exams includes but is not limited to copying work and using prohibited materials such as notes, calculators, or cell phones. Cheating on tests or exams may result in disciplinary action both in this course and at the department and college levels.
- Exams will be given online using a virtual proctoring service; you may also be asked to sign an academic honesty statement.

Honor Code Statement. Students may be asked to sign an honor code statement as part of their submission of any graded work including but not limited to projects, quizzes, and exams: *“I understand and agree to abide by the provisions in the University of Houston Undergraduate Academic Honesty Policy. I understand that academic honesty is taken very seriously and, in the cases of violations, penalties may include suspension or expulsion from the University of Houston.”*

Special needs: Whenever possible, and in accordance with 504/ADA guidelines, the University of Houston will attempt to provide reasonable academic accommodations to students who request and require them. Please call the Center for Students with DisAbilities (CSD) at 713-743-5400 for more assistance. Do not hesitate to contact me to discuss such concerns/needs.

Counseling and Psychological Services (CAPS). (Official university syllabus item)

CAPS can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis. Also, there is no appointment necessary for the “Let’s Talk” program, which is a drop-in consultation service at convenient locations and hours around campus.

(Note: CAPS also has a dedicated website for COVID-19 resources at <https://uh.edu/caps/resources/covid-19/>)

Helpful Information. (Official university syllabus item)

- COVID-19 Updates: <https://uh.edu/covid-19/>
- Coogs Care: <https://www.uh.edu/dsaes/coogscare/>
- Laptop Checkout Requests:
<https://www.uh.edu/infotech/about/planning/off-campus/index.php#do-you-need-a-laptop>
- Health FAQs: <https://uh.edu/covid-19/faq/health-wellness-prevention-faqs/>
- Student Health Center:
<https://uh.edu/class/english/lcc/current-students/student-health-center/index.php>