

Introduction to Differential Equations (Math 2280-001/228-001) Summer 2024

Class meets: 05/13/2024 to 07/31/2024

Time: MTWF 10:00 am - 11:10 am

Place: JFB B-1. See <https://map.utah.edu/>

Holidays: May 27th M (Memorial Day), June 17th M (Juneteenth), July 4th Th (Independence Day), July 24th W (Pioneer Day)

Other Important Dates: See <https://registrar.utah.edu/academic-calendars/summer2024.php>

- May 17th (F): Last day to add without a permission code, Last day to wait list
- May 22nd (W): Last Day to Add,Drop(Delete),Elect CR/NC,or Audit Classes
- June 21st (F): Last Day to Withdraw from classes

Instructor: Dr. Sung Chan Choi, (Office:JWB 113)

Email: Inbox in CANVAS

Do not use @math.utah.edu

Office Hours: 11:30 am- 12:30 pm MWF (JWB 113)

Prerequisites: A grade of C or above in Linear Algebra (MATH 2270).

Course Description: Math 2280 is an introduction to ordinary differential equations, and how they are used to model problems arising in engineering and science. It is the second semester of the year long sequence 2270–2280, which is an in-depth introduction to linear mathematics. Along with Calculus, the linear algebra that you learned in Math 2270 will provide a considerable amount of the conceptual and computational framework for our discussions in Math 2280. This will become more apparent as the course progresses.

Topics:

- Model various dynamical systems arising in math, science, and engineering.
- Learn solution techniques for solving first order separable and linear differential equations.
- Understand how to approximate solutions via slope fields and phase diagram analysis.
- Apply vector space concepts from linear algebra to understand the solution space to linear systems of differential equations.
- Solve constant coefficient linear differential equations via superposition, particular solutions, and homogeneous solutions found via characteristic equation analysis.

- Apply matrix algebra concepts related to eigenvalues, eigenvectors and matrix diagonalization, in order to find the general solution space to first and second order constant coefficient homogeneous linear systems of differential equations.
- Work with matrix exponentials and other fundamental matrix solutions, as tools for understanding linear systems of differential equations with constant coefficients.
- Use linearization as a technique to understand the behavior of nonlinear dynamical systems near equilibrium solutions.
- Learn about Fourier series, and use them as an “infinite superposition” tool to study forced oscillation problems.
- Gain familiarity with the basic partial differential equations of math and physics

Text: *Differential Equations and Boundary Value Problems, Computing and Modeling*, By Edwards & Penney & Calvis, , 5th edition. ISBN: 9780321796981 (available on Canvas, under Bookshelf).

Canvas: Canvas will be used for posting course announcements, homework assignments, grades, files and any relevant supplementary material. You are also welcome to make use of the Canvas discussion board to discuss course problems or topics. You can access the Canvas page through CIS or by logging in at utah.instructure.com. Students should check the Canvas page regularly for course information and resources. Email notifications and correspondence will be sent to the student’s UMail address ([\[u-number\]@utah.edu](mailto:[u-number]@utah.edu)); this email account must be checked regularly.

Additional Resources

- **Tutoring Center & Computer Lab-** There is free tutoring in the T. Benny Rushing Mathematics Student Center (LCB 155, the lower level between JWB and LCB), as well as a computer lab (LCB 155C). The regular hours is M-Th 8:00am - 8:00pm, Fri 8:00am - 6:00pm. See <http://www.math.utah.edu/undergrad/mathcenter.php>
- **Private Tutoring-** University Tutoring Services, 330 SSB. There is also a list of tutors at the tutoring center LCB 155.

Grade Distribution:

Homework	10%
Quiz	25%
Midterm Exam 1 (during the class time, 6/14 (F))	20%
Midterm Exam 2 (during the class time, 7/12 (F))	20%
Final Exam (10:00 am- 12:00 pm, 8/2 (F))	25%

Grading Scale:

[93, 100]	A	[73, 77]	C
[90, 93)	A-	[70, 73)	C-
[87, 90)	B+	[67, 70)	D+
[83, 87)	B	[63, 67)	D
[80, 83)	B-	[60, 63)	D-
[77, 80)	C+	[0, 60)	E

Course Policies:

- **General**

- If you cheat on any homework, quiz or exam, I will automatically give you a zero for that grade.
- **No makeup exams and quizzes will be given** except in the case of a documented emergency. Please contact the instructor ASAP, or at least two classes ahead of time so that the instructor and student can make arrangements to make up the test. I reserve the right to make makeup exams more difficult than the scheduled test.
- There will be **no retakes** of exams and quizzes . . . ever. Your score is what you get.

- **Homework**

- Homework will be announced through Canvas. You will submit it to Gradescope.
- I will grade all homework problems for completeness. It will be worth 1 - 3 point a problem. For example, if you have 30 problems of homework assigned for one week and you solve all 30 problems then you can get 30 points regardless of correctness.
- I will choose 1-2 problems from weekly homework assigned then they will be graded for correctness. Each selected problem will be worth appropriate points based on the total points. To get full points for correctness, you **MUST** show all your work! If you turn in just the answers, with no work shown, you will get a 0 point for correctness.
- So total score will be worth the sum of completeness and correctness. For example, if you have 24 points for completeness and 43 points for correctness then you will acquire 67.
- **Late homework will NOT be accepted.**

- **Daily Quiz**

- The quizzes are given in every class.
- You submit it by uploading on Gradescope.
- I will post the study guide on “Files” in CANVAS. You must check your CANVAS frequently. If you are absent from a class, you cannot take it. Make-up quizzes are not allowed. Since it is worth 25% of your grade, it may damage your grade if you ignore quizzes.
- If you are **absent** from a class, you **cannot take** the quiz. Make-up quizzes are **not allowed**. If you are late over 10 minutes in class, it may be considered absence.
- **6 lowest scores** will be dropped.
- If you have a reason to be absent with a **DOCUMENT**, you need to contact me directly to have a quiz paper. **Don’t** ask a quiz paper from your classmates.

- **Midterms**

- There will be two in-class midterm exams.
- **6/14(F) and 7/12(F)** in the regular classroom.

- **Final**

- The comprehensive final exam will be on **August 2 (F), 10:00 am - 12:00 pm.**
See <https://registrar.utah.edu/academic-calendars/final-exams-summer.php>

- **Attendance:** Like any college course, attendance is not “mandatory” Please note however, that concepts will be thoroughly explained and reviewed in class. Students who regularly attend score on average 30% higher on exams than those who do not.

- **Other Policies**

- I do NOT allow the use of laptop computers in my classroom. But tablets are okay if you are taking notes on it.
- There will be no retakes of exams . . . ever. Your score is what you get.
- You may take an alternate exam if you submit a documented verification about it to me first and explain the extenuating circumstances that make it necessary. Needing to work, babysitting your siblings, oversleeping, or needing more time to study do not pass as acceptable reasons.
- I will demand respectful behavior in my classroom. Examples of disrespect include reading a newspaper or magazine in class, social chatting with your friend in class, text-messaging your buddies during class or cuddling with your girl/boyfriend in class.
- There will be no cursing nor negative ranting (for example, ”math sucks”) on any written work turned in. The penalty for such things on your written work will be a zero score on that assignment or test!
- You need to have a valid email address registered with Campus Information System.
- You need to check CANVAS everyday.
- Student Responsibilities: All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. You have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, collusion, fraud, theft, etc. Students should read the Code carefully and know you are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.
See <http://regulations.utah.edu/academics/6-400.php>

Disclaimer: This syllabus is meant to serve as an outline and guide for our course. Please note that I may modify it with reasonable notice to you. I may also modify the Course Schedule to accommodate the needs of our class. Any changes will be announced in class and posted on CANVAS.

Student Responsibilities: All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from and class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee. <http://regulations.utah.edu/academics/6-400.php>

ADA Statement: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Student Names and Personal Pronouns: Class rosters are provided to the instructor with the student's legal name as well as Preferred first name (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected. If you need assistance getting your preferred name on your UIDcard, please visit the LGBT Resource Center Room 409 in the Olpin Union Building, or email bpeacock@sa.utah.edu to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-5pm, and 8am-6pm on Tuesdays.

Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

Safety Statement: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit <https://safeu.utah.edu/>.