# MATH 1320-009 Engineering Calculus II, Spring 2025

**Class Meetings:** Lecture: MTWF at 8:35am-9:25am HEB 2006
**Lab Meetings:**
Section 010: H at 7:30am-8:20am FASB 250, Section 011: H at 8:35am-9:25am LCB 219
**Instructor:** Keshav Patel (he/him/his) (pronounced like KAY-shove)
**Email:** patel@math.utah.edu
**Office Hours:** See Canvas for times
**Lab Instructor:** Harry Chen and Dmitrii Shadrin
**Lab Office Hours:** See Canvas for times
**Text:** *Calculus: Concepts and Contexts*, by James Stewart (5th edition)
An e-version of the textbook will automatically show up in Canvas provided that the student opts in to the "inclusive access" program (which is the default case). The text is a $67.01/semester rental that is added to the course fee.

**Course Information:** Math 1320 Calculus I is a 4 credit course.
**Course Description:** Differential and integral calculus with a focus on engineering applications and projects; functions and models; rates of change in science and engineering, limits and derivatives; related rates; derivatives and shapes of graphs; optimization; Newton's method; definite integrals, antidifferentiation and Fundamental Theorem of Calculus; techniques of integration; numerical and symbolic integration with software; arc length, area, and volumes via integration. This is a 4 credit hour course that satisfies a quantitative reasoning requirement.

**REQUIRED TECHNOLOGY: A camera that can be used to take high quality photos of assignments and an internet-connected device to view/upload homework and complete Canvas quizzes.**

**Canvas:** Canvas will be used for posting course announcements, accessing Gradescope, as well as homework assignments, grades, files and any relevant supplementary material. Quizzes will also be assigned through Canvas. Students 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); this email account must be checked regularly.

**Gradescope:** Gradescope will be used to turn in homework, and where homework grades can be viewed. Students may submit regrade request via gradescope within a week of the assignment being graded if they believe an error has been made.

**Grading:** The following are the grade components and the percentage each contributes to a student's final grade:

- **Homework Assignments (15%)**- There will be approximately twelve homework assignments during the semester. Each homework will cover three to four textbook sections are due most Fridays by 11:59 pm via gradescope. The homework will typically cover material covered up to and including the preceding Tuesday. A few problems will be selected for grading, and all other problems will be graded for completion. For a problem to be considered "complete", there MUST be work shown (see below on "What does it mean to show your work?"). The highest ten homework grades will be factored into the final grade. Late homework will, in general, not be accepted. Regrade requests must be made via Gradescope within one week of when the assignment's grade was posted.

- **Labs (15%)**- Every Thursday a directed lab session will be held. These lab sections consist of working on lab worksheets in groups. The lab instructor will be there to help guide students through the problems. See the lab TA's syllabus for specific breakdown of grades and submission policies. If a student does not attend lab, it is their responsibility to reach out to the Lab TA to get access to the

lab. Students will be expected to complete the worksheet outside of lab if they do not finish it during lab. The lowest lab score will be dropped.

- **Quizzes (10%):** Quizzes will be given most Fridays to see where students are at with the material. The quizzes will be composed of a few questions covering the material since the previous Friday's class. The quizzes will be available from Friday through Sunday, although they will be timed, so once started it must be finished. The quizzes will be open book and note. The quizzes will be administered via Canvas. Some number of quizzes will be dropped.
- **Midterm Exams (35%, 17.5% each)**- Two 50-minute midterm exams will be given in-class. The exams will cover approximately two chapters worth of material. A practice exam will be posted a week prior to the midterm that will cover the same material. **Dates of the midterm exams are tentatively scheduled for Wednesday, February 19th and Wednesday, March 26th.** Midterms will be closed note and closed book. For a problem to be considered "complete", there MUST be work shown (see below on "What does it mean to show your work?"). An alternate exam can be requested in the case of serious emergencies or university excused absenses, but they can only be given BEFORE the original exam date, not after. Therefore, it is up to the student to notify me immediately so that we can plan accordingly. Regrade requests must be made via Gradescope within one week of when the exam's grade was posted.
- **Final Exam (25%)**- A two-hour comprehensive exam will be given. As with the midterms, a practice final will be posted a week prior. Our final exam is scheduled in HEB 2006 on Thursday, April 24, 2025, 8:00 am – 10:00 am. The final can not be rescheduled. The final will be closed note and closed book. If a student's final exam grade is higher than a midterm grade, I will replace ONE midterm grade with their final exam grade.

Students with university excused absences (band, debate, student government, intercollegiate athletics) should make alternate arrangements with me as soon as possible if the absence interferes with any course components.

Final course letter grades will be determined according to this table:

| **Greater Than Or Equal To (%)** | **Lesser Than (%)** | **Grade** |
|---|---|---|
| 93 | $\infty$ | A |
| 90 | 93 | A- |
| 87 | 90 | B+ |
| 83 | 87 | B |
| 80 | 83 | B- |
| 77 | 80 | C+ |
| 73 | 77 | C |
| 70 | 73 | C- |
| 67 | 70 | D+ |
| 63 | 67 | D |
| 60 | 63 | D- |
| 0 | 60 | E |

I retain the right to modify this grading scheme during the course of the semester; students will, of course, be well notified of any adjustments.

**Calculators**: Calculators will not be allowed on exams. They may be used on homework, but students should still write out the details of the computation. It is in the student's best interest not to become too dependent on a calculator since they will not be allowed on exams.

**Group Work**: Math is collaborative! Discussing example problems will be an important aspect of lectures,

and students are encouraged to work on homework together. However, every student should submit their own assignments, and assignments should contain the individual's own work, not a copy of someone else's work. Exams will be individual assessments, so make sure everyone in the group understands the solutions to homework problems so everyone is prepared for the exams.

**What does it mean to show your work?**: In this class, showing an understanding of the problem solving strategies is as important (if not more so) than finding the correct answer to a question. Therefore, it is important that for each problem, some form of justification is given. This could mean showing a calculation, giving a definition, drawing a picture, writing out the steps involved, etc.

**Additional Resources**

- **Tutoring Center & Computer Lab**- There is free tutoring in the T. Benny Rushing Mathematics Student Center (room 155, the lower level between JWB and LCB), and in FASB 205. For more information see http://www.math.utah.edu/undergrad/mathcenter.php.
- **Private Tutoring**- ASUU Tutoring Center, 330 SSB. There is also a list of tutors at the math department office JWB 233.

**Expected Learning Outcomes:** Upon successful completion of this course, a student should be able to:

1. construct integrals for a variety of applications, including computing volumes, arc lengths, and work
2. understand convergence of sequences and series
3. understand how functions can be represented as power series over a radius of convergence
4. understand Taylor Series and their applications
5. plot and visualize curves and surfaces in three dimensions; utilize other coordinate systems to represent curves and surfaces
6. compute vector algebra operations including dot products and cross products
7. define vector-valued functions and compute partial derivatives
8. perform optimization on multivariate functions
9. construct and compute iterated integrals to calculate volumes of solids; utilize other coordinate systems in integration

**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

**Office of the Dean of Students:** The Office of the Dean of Students is dedicated to being a resource to students through support, advocacy, involvement, and accountability. It serves as a support for students facing challenges to their success as students, and assists with the interpretation of University policy and regulations. To contact the Office of the Dean of Students, please email deanofstudents@utah.edu or call 801-581-7066. There is more information at https://deanofstudents.utah.edu/ .

**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 us 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.

**University Counseling Center:** The UCC staff is committed to supporting the mental health needs of our campus community. Their phone number is 801-581-6826. Their hours are Monday-Friday, 8:00am-5:00pm. For after-hours emergencies, contact the 24/7 Crisis Line: 801-587-3000. More information is at https://counselingcenter.utah.edu/ .

**Dignity/Belonging Statement:** I stand in support of compassion, dignity, value-of-life, fair treatment, belonging, and justice for all individuals regardless of color, race/ethnicity, sexual orientation, religion, language, socioeconomic status, ability, gender, gender identity or expression, immigration status, or any type of marginalization. I stand in support of making our society more fair and compassionate for all individuals. I stand against discrimination in all its various forms.

**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, veterans 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 me with the students 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 safeu.utah.edu.

**Course Roadmap Week-by-Week:** Below is an outline of the sections and topic covered in this course. Schedule subject to change

| Week | Topics | Sections | Exams |
|---|---|---|---|
| Week 1 | Solids of Revolution | 6.1-6.3 | |
| Week 2 | Applications of Integration | 6.4-6.6 | |
| Week 3 | Sequences and Series | 8.1-8.2 | |
| Week 4 | Convergence and Power Series | 8.3-8.5 | |
| Week 5 | Power Series and Taylor Series | 8.6-8.8 | |
| Week 6 | Vector Algebra | 9.1-9.4 | |
| Week 7 | Equations of Curves and Surfaces | 9.5 | Midterm 1 |
| Week 8 | Vector Functions | 9.6-9.7, 10.1 | |
| Week 9 | Vector Functions | 10.2-10.4 | |
| | SPRING BREAK | | |
| Week 10 | Partial Derivatives | 10.5, 11.1-11.2 | |
| Week 11 | Vector Calculus | 11.3-11.4 | Midterm 2 |
| Week 12 | Gradients and Optimization | 11.5-11.7 | |
| Week 13 | Multiple Integrals | 11.8, 12.1-12.2 | |
| Week 14 | Multiple Integrals | 12.3-12.4 | |
| Week 15 | Review | | |