

MATH 3220 - 002 Foundations of Analysis II, Spring 2024

Class Meetings: MoTuWeFr from 11:50am - 12:40pm in **JTB 110**

Instructor: Dr. Tim Tribone (he/him/his)

Email: tim.tribone@utah.edu

Office: JWB 328

Office Hours: MoTuWe after class, Fr TBD, location TBD

Text: *Foundations of Analysis*, by Joseph Taylor. For information on purchasing the textbook, go to <https://www.math.utah.edu/resources/bookinfo.php>

Course Information: Math 3220 Foundations of Analysis is a 4 credit course. We will cover Chapters 7-10 and some of Chapter 11 (time permitting).

Course Description: This is the second course in the MATH 3210 - 3220 Foundations of Analysis sequence, and focuses on the theory behind multi-variable calculus. The emphasis is on improving the students ability to understand and explain concepts precisely, logically, and completely, especially their ability to understand and write mathematical proofs. The course begins with the definition of topology in Euclidean space. Compactness and connectedness are introduced in this context, and the Heine - Borel theorem is one of the main theorems students prove in this part of the course. The definitions of limits, continuity and convergence are revised from the topological point of view. The course moves on to give a rigorous approach to differentiation in several variables, Taylor formula, and Riemann integration on Jordan regions. This part includes applications to optimization via Lagrange multipliers, parametrizations of higher dimensional surfaces in Euclidean spaces, and computation of their tangent spaces and volumes.

Prerequisites: 'C' or better in MATH 3210 AND (MATH 2250 OR MATH 2270 OR MATH 2271)

Canvas: Canvas will be used for posting course announcements, homework assignments, grades, files and any relevant supplementary material. You can access the Canvas page through CIS or by logging in at utah.instructure.com. Students should check the Canvas announcements 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.

Discord: There is a Discord server for our class (link will be on Canvas). Use this server to connect with your classmates; ask for help with homework, ask for notes from a class that you missed, organize study sessions, etc. I also keep Discord open on my computer so it is often a good way to ask me a quick question. Any privacy protected questions (about grades, absences, etc) must be sent through Canvas or by email. Please keep discord communication appropriate and respectful.

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

- **Homework (30%)** - A selection of problems will be due most Fridays by the end of the day (11:59pm). Some problems will be graded for completion and others for quality. The lowest homework score will be dropped. Homework will be turned in electronically through Gradescope. You may work together on homework, and I encourage you to do so, but everyone needs to write up their own solutions.

I am also strongly suggesting you type up your homework solutions in L^AT_EX. I will be providing tex files for each homework to get you started. I will also give a demo on getting started with **Overleaf** near the beginning of the semester.

Late Policy: There is an automatic two-day grace period for homework. In other words, you may turn in your homework up to 48 hours late with no penalty. You do not need to ask for this extension. After the 2-day extension, late assignments will not be accepted except in rare situations.

- **True/False Quizzes (5%)** - A *one-problem* True/False quiz will be given at the beginning of every class (except quiz and exam days). The lowest 5 T/F quiz scores will be dropped at the end of the semester.
- **Proof Writing Quizzes (20%, 4% each)** - In addition to the exams, there will be five quizzes given throughout the semester on Fridays. These quizzes will cover the relevant material but they will also be specifically aimed at assessing your proof writing skills. There will also be a group component. Each is worth 4% of your total grade.

The dates of the quizzes are listed below:

- **Quiz 1: January 19, 2024**
- **Quiz 2: February 2, 2024**
- **Quiz 3: March 1, 2024**
- **Quiz 4: March 22, 2024**
- **Quiz 5: April 19, 2024**

- **Midterm Exams (14% each)** - Two 50-minute midterm exams will be given on select Fridays (in our normal classroom).

Dates of the midterm exams will be:

- **Exam 1: February 16, 2024**
- **Exam 2: April 5, 2024**

These dates are subject to change.

- **Final Exam (17%)** - A two-hour comprehensive exam will be given at the end of the summer semester. Our final exam is scheduled for

Friday, April 26, 2024 | 10:30am - 12:30pm

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.

Canvas will always display a “Total” score. This is a tool to help you approximate your current grade but it is **not** your official grade. Your final course grade will be calculated at the end of the semester according to the table below.

Grading Scale: Final course letter grades will be determined by the table below:

Letter Grade	% Range
A	[93, 100]
A-	[90, 93)
B+	[87, 90)
B	[83, 87)
B-	[80, 83)
C+	[75, 80)
C	[70, 75)
C-	[65, 70)
D+	[60, 65)
D	[50, 60)
D-	[40, 50)
E	[0, 40)

The instructor retains the right to modify this grading scheme during the course of the semester; students will, of course, be notified of any adjustments.

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), as well as a computer lab. For more information see <https://www.math.utah.edu/undergraduate/mathcenter.php>
- **Private Tutoring** - ASUU Tutoring Center, 330 SSB. There is also a list of tutors at the math department office JWB 233.

COVID Statement: The COVID-19 guidelines for the University of Utah are adapted often due to the ever-changing status of the pandemic. For the most up-to-date information regarding the campus guidelines, visit <https://coronavirus.utah.edu>.

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, 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 instructor 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.

University Counseling Center The University Counseling Center (UCC) provides developmental, preventive, and therapeutic services and programs that promote the intellectual, emotional, cultural, and social development of University of Utah students. They advocate a philosophy of acceptance, compassion, and support for those they serve, as well as for each other. They aspire to respect cultural, individual and role differences as they continually work toward creating a safe and affirming climate for individuals of all ages, cultures, ethnicities, genders, gender identities, languages, mental and physical abilities, national origins, races, religions, sexual orientations, sizes and socioeconomic statuses.

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. Please consider reaching out to the Office of Dean of Students

for any questions, issues and concerns. 200 South Central Campus Dr., Suite 270. Monday-Friday 8 am-5 pm.

Student Success Advocates: The mission of Student Success Advocates is to support students in making the most of their University of Utah experience (ssa.utah.edu). They can assist with mentoring, resources, etc. Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact a Student Success Advocate for support <https://asu.utah.edu/displaced-students>.