

# MATH 3210 - 003 Foundations of Analysis, Fall 2022

**Class Meetings:** MoTuWeFr at 10:45 - 11:35am in BU C 208

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

**Email:** tribone@math.utah.edu

**Office Hours:** TBA

**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 3210 Foundations of Analysis is a 4 credit course. We will cover Chapters 1-6 in Taylor's book.

**Course Description:** Logic, methods of proof and mathematical argument in mathematical analysis. Rigorous reconsideration of the real-number system, infinite series and of continuity, differentiation and integration for functions of one variable. The emphasis is on improving the students ability to understand and explain concepts in a logical and complete manner.

**Prerequisites:**  $C$  or better in at least one class in each of the following groups:

- MATH 1260, MATH 1321, MATH 2210, MATH 2310, MATH 3140
- MATH 2200, MATH 2270, MATH 2250

**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 if 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](http://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.

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

- **Homework (35%)** - 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 Canvas. 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  $\text{\LaTeX}$ . 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:** You may request a two-day extension on any assignment. However, you must request the extension *before* the deadline. Otherwise, no late assignments will be accepted.

- **Classwork and Participation (5%)** - Throughout the semester there will be opportunity for you to work with your classmates on mathematics. This may include group assignments, group presentations, and/or group projects. Your participation in these activities will be evaluated based on effort/completion and will make up 5% of your total grade.
- **Midterm Exams (18% each)** - Two 50-minute midterm exams will be given on select Fridays (in our normal classroom). Dates of the midterm exams will be **Friday Sept. 23rd** and **Friday Nov. 4th**. Note that these dates are subject to change.
- **Final Exam (24%)** - A two-hour comprehensive exam will be given. Our final exam is scheduled for **Thursday, Dec 15 10:30am - 12:30pm** in BU C 208.

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 as follows: If  $X$  is your course percentage weighted according to the above, then  $\{X \geq 93\% \Rightarrow A, X \geq 90\% \Rightarrow A-, X \geq 87\% \Rightarrow B+, X \geq 83\% \Rightarrow B, X \geq 80\% \Rightarrow B-, X \geq 77\% \Rightarrow C+, X \geq 73\% \Rightarrow C, X \geq 70\% \Rightarrow C-, X \geq 65\% \Rightarrow D+, X \geq 60\% \Rightarrow D, X \geq 55\% \Rightarrow D-, X < 55\% \Rightarrow E\}$ .

The instructor retains the right to modify this grading scheme during the course of the semester; students will, of course, be well 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.
- **Departmental Videos** - The math department has a full set of lecture videos which you are welcome to use to supplement our course material. These can be found at <http://www.math.utah.edu/lectures/>

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

1. Understand the differences between the natural numbers, integers, rational numbers and real numbers, and be able to prove basic statements about them.
2. Understand the axioms of the real number system and have a big-picture understanding of how concepts in Calculus 1 can be proven.
3. Be able to provide examples and non-examples illustrating various properties of sets and functions.
4. Become comfortable with denitions as being precise mathematical statements and use them to prove statements.
5. Write proofs using “ $\epsilon - \delta$  arguments” and understand their meaning.
6. Have increased fluency in the the language of mathematics.

**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](mailto: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](http://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](http://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](http://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://asuu.utah.edu/displaced-students>.

## Approximate Schedule:

Weeks 1 - 3 Chapter 1

**Weeks 4 - 6** Chapter 2 **Note, Friday Sep. 2nd is the last day to drop**

**Weeks 7 - 9** Chapter 3 (week 8 is Fall break) **Note, Friday Oct. 21st is the last day to withdraw**

**Weeks 10 - 12** Chapter 4

**Week 13** Chapter 5

**Weeks 14 - 16** Chapter 6

**Week 17** Final Exam: Thursday Dec. 17th from 10:30am - 12:30pm in BU C 208.