

Syllabus: MATH 3210 - Summer 2023

GENERAL DETAILS

Course Description

- **Course Number and Title:** MATH 3210, Foundations of Analysis I
- **Semester and Year:** Summer 2023
- **Course Overview:** 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 student's ability to understand and explain concepts in a logical and complete manner.
- **Location:** In-person, LCB 225
- **Timing:** MTWR 08:45-09:45AM
- **Instructor Info:** My name is Abhay Goel (he/him/his). I am a graduate student interested in number theory.
- **Contact Info:** abhay.goel@utah.edu. I also typically reply quickly via Canvas.
- **Support:** In my experience, mathematics is learned through inquiry and problem-solving; I highly encourage you to ask questions frequently. To facilitate this, I will also typically come to class a few minutes early as often as possible to discuss any general questions you may have and will end classes with a reflection. My office hours will be listed on Canvas by the end of the first week of classes.

COURSE DETAILS

Prerequisites

The Math Department does not currently require prerequisites for mathematics courses. The former prerequisites for Math 3210 are listed below. These are still recommended as guidelines for your success:

- C or better in one of: MATH 2210, MATH 1260, MATH 1321, MATH 2310, MATH 3140; AND
- C or better in one of: MATH 2200, MATH 2270, MATH 2271, MATH 2250

Course Materials

- **Textbook:** *Foundations of Analysis*, Joseph L. Taylor. Homework will be assigned as problems from this textbook. Either a physical or digital copy of the textbook should suffice for this class.
- **Other:** The course website is on Canvas.

Technical Requirements

- **Calculator:** You may find it helpful to have a graphing calculator for your own personal use. However, calculators will not be allowed (nor needed) on exams or quizzes.
- **Internet Access:** Needed to access course materials.
- **Scanning Device:** Needed to turn in assignments.

Attendance & Punctuality

Students are expected to attend classes and, if classes are missed, to go through the material covered in class by attending office hours, reading the textbook, working through problems, and thinking about course ideas. In-class attendance will be recorded, with some number (to be determined) of absences excused without question. For exams, exceptions are made if there are extenuating circumstances.

UofU Learning Support

- **Math Student Center:** <http://www.math.utah.edu/undergraduate/mathcenter.php>
- **Learning Center:** <https://learningcenter.utah.edu/>
- **Student Success Coaches:** <https://ssc.utah.edu/>

EXPECTED LEARNING OUTCOMES

1. Be able to read and evaluate a mathematical proof for completeness and accuracy.
2. Be able to write a mathematical proof to communicate and convince other mathematicians of a given claim.
3. Know the essential properties of the real numbers: the unique complete, ordered field.
4. Know how these properties interact with notions of calculus: limits, continuity, derivatives, and integrals.

COURSE DESIGN

Lectures

Classes will primarily consist of lectures with some time to discuss and practice material. Participation is encouraged.

Homework Assignments

Homework will be assigned and submitted weekly, with a 20% penalty for assignments turned in late, up to one week. Each assignment will consist of about seven problems, so I encourage you to try to do one problem per day!

Reflections

Most classes will end with a short written reflection of some kind. This might ask you to write the statement of a theorem or definition, it might ask you simply if you have any topics you want covered more deeply, or it might ask you to investigate a proof for errors. These are not graded for correctness, but they track attendance and will be returned to you so that we remain in dialogue.

Exams

There will be two midterms dividing the semester roughly into thirds. The final exam will take place at the time specified by the university calendar, and will cover material from the full course, with emphasis on material not covered by the previous midterms.

CLASS SCHEDULE & IMPORTANT DATES

Weekly Breakdown

Homework will be due on Thursdays. Here is the tentative schedule of topics:

Week	Dates	Material covered (textbook sections)
1	5/15-5/18	1.1, 1.2
2	5/22-5/25	1.3, 1.4, 1.5, 2.1
3	5/29-6/1	2.2, 2.3, 2.4
4	6/5-6/8	2.5, 2.6, Midterm review
5	6/12-6/15	3.1, 3.2, 3.3
6	6/19-6/22	3.4, 4.1
7	6/26-6/29	4.2, 4.3, 4.4, Midterm review
8	7/3-7/6	5.1, 5.2
9	7/10-7/13	5.3, 5.4, 6.1, 6.2
10	7/17-7/20	6.3, 6.4, 6.5
11	7/24-7/27	Final review
12	7/31-8/4	Final review

This is almost certainly too ambitious, and so we will slow down from this schedule as needed.

Important Dates

- **Classes begin:** 5/16 (NOTE: We will not have class on 5/15)
- **Holidays (no class):** 5/15, 5/29, 6/19, 7/4, 7/24
- **Midterm 1:** 6/12
- **Midterm 2:** 7/3
- **Last day to add without a permission code:** 5/19
- **Last day to add/drop:** 5/24
- **Last day to withdraw:** 6/23
- **Last day of class:** 8/2
- **Final exam:** 8/4 (7:30-9:30AM)

ASSIGNMENTS, ASSESSMENT, GRADING, & LATE POLICY

Grade Breakdown

Category	Percent of Grade	Adjustments
Homework	20%	Lowest three scores dropped.
Reflections	10%	Eight reflections can be missed.
Midterm 1	20%	Lowest midterm grade can be replaced with final.
Midterm 2	20%	Lowest midterm grade can be replaced with final.
Final exam	30%	-

Grading Scale

A	[93,100]	B+	[87,90]	C+	[77,80]	D+	[67,70]	E	[0,50]
A-	[90,93)	B	[83,87)	C	[73,77)	D	[60,67)		
		B-	[80,83)	C-	[70,73)	D-	[50,60)		

Regrading Policy

If a grade is recorded incorrectly, it is the student's responsibility to let me know in a timely manner (at the latest within 2 weeks of when the grade was recorded).

Late Policy

The course is designed to provide flexibility if you occasionally cannot turn work in on time by a) allowing assignments to be submitted late at a penalty, and b) dropping a certain number of scores at the end of the semester. In general, you are expected to turn in homework on the due dates.

Makeup Policy for Exams

For planned absences during midterm dates, please inform me 2 weeks ahead of the actual exam date, so that I have time to arrange a makeup exam and you have time to study. If you miss your exam because of illness or another situation which arises suddenly, talk to me as soon as you are aware of your situation to plan for a makeup. If you miss an exam, but it is not due to an extreme situation, also contact me. We will discuss makeup options, but there will be a penalty for taking the exam late.

Extreme Situations: If you have an extraordinary situation, contact me. We can discuss adjustments to the above policies.

Other Grading Policies

For anything not documented here, including CR/NC and incompletes, please refer to the following:

- <https://catalog.utah.edu/#/policy/B12v3LX0G>
- <https://www.finearts.utah.edu/images/A-Guide-to-Incompletes.pdf>

COMMUNICATION

1. All course materials, including assignments, solutions, and grades, will be posted on the course Canvas site.
2. Class announcements will be done via the Canvas announcements page. You will be responsible for any information contained in them. You are also strongly advised to set up notifications for Canvas so you do not miss any important notifications.
3. Feel free to contact me via Canvas or email for questions, I will do my best to answer emails within 24 working hours. I would also like to encourage you to email me only if it is something personal that requires individual attention. If instead you have questions about the logistics of the class, course material and assignments, or anything else your classmates might wonder as well, please post a question on the Canvas discussions board. This way the information is shared quickly to the entire class, and everyone benefits from seeing other classmates' questions and the responses.

ACADEMIC CODE OF CONDUCT

You are encouraged to review the "Student Code" for the University of Utah: <https://regulations.utah.edu/academics/6-400.php>. In order to ensure that the highest standards of academic conduct are promoted and supported at the University, students must adhere to generally accepted standards of academic honesty, including but not limited to: refraining from cheating, plagiarizing, research misconduct, misrepresenting one's work, and/or inappropriately collaborating. A student who engages in academic misconduct as defined in Part I.B. may be subject to academic sanctions including but not limited to a grade reduction, failing grade, probation, suspension, or dismissal from the program or the University, or revocation of the student's degree or certificate. Sanctions may also include community service, a written reprimand, and/or a written statement of misconduct that can be put into an appropriate record maintained for purposes of the profession or discipline for which the student is preparing.

ADDITIONAL POLICIES AND RESOURCES

Names/Pronouns

Canvas allows students to change the name that is displayed AND allows them to add their pronouns to their Canvas name. I highly recommend doing this. 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, which can be managed at any time). While CIS refers to this as merely a preference, I will refer to you only with the name and pronoun that feels best for you in class or on assignments. Please advise me of any name or pronoun changes so I can help create a learning environment in which you, your name, and your pronouns are respected. If you need any assistance or support, please reach out to the LGBT Resource Center: <https://lgbt.utah.edu/>.

Teacher's Inclusivity Statement

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a strength. It is my intent to present materials and activities that are respectful of diversity: age, disability, gender, gender expression, gender identity, national origin, political affiliation, race, religion, sexual orientation, and other unique identities.

I strongly support the axioms of inclusivity put forth by Federico Ardila:

Axiom 1. Mathematical potential is distributed equally among different groups, irrespective of geographic, demographic, and economic boundaries.

Axiom 2. Everyone can have joyful, meaningful, and empowering mathematical experiences.

Axiom 3. Mathematics is a powerful, malleable tool that can be shaped and used differently by various communities to serve their needs.

Axiom 4. Every student deserves to be treated with dignity and respect.

Discrimination and Harassment

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, Affirmative Action, and Title IX (135 Park Building; 801-581-8365), or the Dean of Students Office (270 Union Building; 801-581-7066). To report to the police, contact the Department of Public Safety (801-585-2677). Please see the Student Bill of Rights, section E (<http://regulations.utah.edu/academics/6-400.php>). I will listen to and believe you if someone is threatening you.

The Americans with Disabilities Act

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, contact the Center for Disability & Access (162 Union Building, 801-581-5020). CDA will work with you and me to make arrangements for accommodations.

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 on the basis of your sex, including sexual orientation or gender identity/expression, you are encouraged to report it to the University's Title IX Coordinator (Office of Equal Opportunity, Affirmative Action, and Title IX; 135 Park Building; 801-581-8365), or to the Dean of Students Office (270 Union Building; 801-581-7066). For support and confidential consultation, contact the Center for Student Wellness (330 Student Services Building; 801-581-7776). To report to police, contact the Department of Public Safety (801-585-2677).

University 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 (801-585-2677). 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/>.

Privacy Policy

FERPA, the federal law that guards student privacy, prohibits me from discussing your performance in this class with anyone except you without your permission, which must be on file with the university, not simply told to me. To ensure compliance with this law, send e-mail with a university e-mail address or via Canvas mail. Out of respect for the privacy of your classmates, do not record or screenshot any part of this class for use outside of this class, even if you omit identifying information about the speaker or poster. You may not circulate or share images, clips, or other course materials with individuals who are not enrolled in this class. Doing so is a serious violation of our class ethical code and will result in a charge of academic misconduct.

Student Mental Health Resources

Rates of burnout, anxiety, depression, isolation, and loneliness are high among undergraduate students at all U.S. universities, and have noticeably increased during the pandemic. If you need help, campus mental health resources are available: <https://studentaffairs.utah.edu/mental-health-resources/index.php>. This includes counseling, trainings, and other support. If you feel like you need extra support in academics, overcoming personal difficulties, or finding community, then more information about campus resources can be found here: <https://www.utah.edu/students/services.php>.

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. More information about the counseling center, including ways to contact them, can be found here: <https://counselingcenter.utah.edu/>.

Syllabus Subject to Change

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.