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Math 3210 - 1 Foundations of Analysis I Dec. 29, 2023
Tentative Syllabus for Spring 2023

Credit Hours: Four

Meeting Time: M, T, W, F 9:40 - 10:30 am, JTB 120 - - - In Person.

Homepage: <http://www.math.utah.edu/~treiberg/M3210D.html>

Instructor: Prof. A. Treibergs (he/him/his)
Campus Office JWB 224, 581 - Å8350.
Office Hours: MTF 11:50 AM - 12:55 PM

E-mail: treiberg@math.utah.edu

Text: Joseph L. Taylor, Foundations of Analysis, American
Mathematical Society, Providence 2012.
ISBN 978-0-8218-8984-8

Zoom: No students are isolating due to Covid now. But should
some students need to isolate, the class shall be made
simultaneously available live and broadcast on ZOOM.

Problem Sessions Optional ZOOM only problem sessions will be held during
class time on Thursdays where we will discuss homework
solutions.

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COVID INFORMATION

When students and faculty return to campus for the Spring 2023 semester, masks will not be required in indoor spaces on main campus. But it is important that our campus remain "mask-friendly." Those who still wish to wear masks are encouraged to do so, especially those at high risk of severe illness from COVID-19. University COVID page: <https://coronavirus.utah.edu>

We also strongly encourage you to follow these offerings and protocols:

- Test weekly for COVID-19, even if asymptomatic
- Get vaccinated against COVID-19 and get a booster when eligible
- If you have been exposed but do not have symptoms, you do NOT need

to quarantine but wear a tight-fitting mask for 10 days. If you have symptoms, get tested. If you have a positive test, isolate at home staying home for 5 days. See the full University guidelines: <https://coronavirus.utah.edu/wp-content/uploads/sites/2/2022/12/utah-covid-19-guidance-20221220.pdf>

Vaccination

Students who attend the University of Utah are required to be fully vaccinated against measles, mumps, and rubella (MMR). With the full FDA approval of the COVID-19 vaccine, the university is also requiring COVID-19 vaccination. <https://studenthealth.utah.edu/services/immunizations/index.php>

If you are ready to receive a COVID-19 vaccine, you have two convenient options:

- U of U students can schedule an appointment with Student Health <https://studenthealth.utah.edu/services/immunizations/index.php>
- Visit <https://www.vaccines.gov>

Remember: Students must self-report if they test positive for COVID-19 via this website: <https://coronavirus.utah.edu/>.

A. COURSE DESCRIPTION

Four credits. Prerequisites: "C" or better in ((MATH 2210 OR MATH 1260 OR MATH 1280 OR MATH 1321 OR MATH 3140) AND (MATH 2200 OR MATH 2270 OR MATH 2250)). It is recommended that students either received A grades in both MATH 2210 and MATH 2270 or have taken MATH 2200.

B. COURSE DETAILS

> Course Type: In person.

> Location & Meeting Times:
M, T, W, F 9:40 - 10:30 am - - - In person.

> Optional office hours and problem sessions may be conducted via ZOOM.

> Attendance & Punctuality:

It is strongly recommended that students attend class at the scheduled class time. Exams will take place during these times. Since we will strive to encourage class discussion, is a matter of courtesy to be on time.

> Canvas Page and Zoom Broadcast:

There will be a CANVAS page associated to this class. It will be used to post exam scores and grades and to make video material available. You will be able to access the zoom problem sessions for this class from the the CANVAS page.

> COVID-19 Considerations:

Students must self-report if they test positive for COVID-19 via coronavirus.utah.edu.

> Instructional Support Team:

Instructor will grade the exams. A grader will read weekly homework.

> Course Materials:

Textbook: Joseph L. Taylor, Foundations of Analysis, American Mathematical Society, Providence 2012. ISBN 978-0-8218-8984-8
Students may find other editions, but the student is responsible for solving the correct homework problems, which will be assigned from the 3rd edition. Course materials other than the textbook will be available on line at the course webpage and in canvas.

> Technical requirements:

Students are expected to be computer literate and Canvas and zoom navigation skills are expected. Knowledge and navigation of canvas and zoom is critical to access all features and resources of this course. It is expected expectation that students log into Zoom for class with audio and video enabled.

A strong internet connection and adequate bandwidth is needed.

Exams will be taken in class at the scheduled times.

For technical assistance, review the Canvas Getting Started Guide for Students and/or contact TLT, Knowledge Commons.

> 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 the course webpage.

C. CONTENT OVERVIEW

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 student's ability to understand and explain concepts in a logical and complete manner.

Topics:

The theory of one variable calculus and the essentials of the professional mathematician: logic, proof and the writing of a mathematical argument. We will cover most or all of the following chapters

- Chapter 0 - Review Sets, Logic, Quantifiers, Functions. (2 Lectures)
- Chapter 1 - The Real Numbers (10 Lectures)
- Chapter 2 - Sequences (9 Lectures)
- Chapter 3 - Continuous Functions (9 Lectures)
- Chapter 4 - The Derivative (8 Lectures)
- Chapter 5 - The Integral (6 Lectures)
- Chapter 6 - Infinite Series (6 Lectures)

D. COURSE EXPECTED LEARNING OUTCOMES

Upon successful completion of Math 3210 - Foundations of Analysis I, students will be able to: Describe the real line as a complete, ordered field; Determine the basic topological properties of subsets of the real numbers; Use definitions of convergence; Approximate limits of sequences, sums of series, functions and integrals; Determine the continuity, differentiability, and integrability of functions defined on subsets of the real line; Apply the Mean Value Theorem and the Fundamental Theorem of Calculus to problems in the context of real analysis; Master definitions; Produce rigorous proofs of results that arise in the context of real analysis; Write solutions to problems and proofs of theorems in technical English that meets rigorous standards based on content, organization and coherence, argument and support, style and mechanics; Present a mathematical argument verbally.

E. COURSE DESIGN

Material will be presented in lectures and read from the text and other sources. Students will solidify their learning by solving problems assigned weekly. Students will ask questions and present solutions in regular classroom discussions and zoom office hours. Students may benefit from one-on-one instruction by consulting the instructor during office hours. The student is expected to take the responsibility to ask for help when needed.

All exams for this course will also be held in person during class times. Students will solidify their learning by solving problems assigned weekly and will prepare written solutions for weekly homework.

F. EVALUATION METHODS AND GRADING

Homework: To be assigned weekly. Homework will be due Fridays and will be collected in class. Papers turned into my mailbox in the math mail room (JWB 228) by 3:00 PM Fridays will be regarded as being turned in on time. Homework that is late but not more than one week late will receive half credit. Homework that is more than one week late will receive no credit at all.

Exams: Exams will be taken in person during class time. Exams will be closed book except that you may bring a "cheat sheet," an 8.5" x 11" piece of paper with notes on both sides. Your text, other books, notes, homework papers, calculators laptops, tablets, phones and text messaging devices will not be allowed.

Midterms: There will be three in-class one-hour midterm exams on Wednesdays Feb. 1, Mar. 1 and Apr. 5.

Final Exam: Wed., May 3, 8:00 - 10:00 am. Half of the final will be devoted to material covered after the third midterm exam. The other half will be comprehensive. Students must take the final to pass the course.

Course grade: Best two of three midterms 40% + HW 30% + final 30%.
 Grades will be assigned by the following cutoffs, based on previous classes. If the total point values are 100 for midterms, 150 for homework and 150 for the final, then if the sum of points is at least S then your grade will be

S	Grade
385	A
370	A-
335	B+
300	B
275	B-
250	C+
200	C
175	C-
150	D+
125	D

G. CLASS SCHEDULE & IMPORTANT DATES

Class meets at M, T, W, F from 9:40 - 10:30 am in person starting January 9 and ending April 25.

Last day to add without permission code is Jan. 13. Last day to drop class is Jan. 20. Until Mar. 3 you can withdraw from class with no approval at all. After that date you must petition your dean's office to be allowed to withdraw. Please check the academic calendar for more information pertaining to dropping and withdrawing from a course. Withdrawing from a course and other matters of registration are the student's responsibility.

Exam Dates: There will be three in-class 50 minute midterm exams on Wed. Feb. 1, Mar. 1 and Apr. 5. The final exam is Wed., May 3, 8:00 - 10:00 AM. The final is at the University scheduled time. Students must take the final to pass the course.

Holidays: There will be no classes on Monday, Jan. 16 (Martin Luther King Holiday), Feb. 20 (Presidents Day) and Mar. 6 - 10 (Spring Break).

H. COMMUNICATION

Clarification which forms of communication and responsibilities of students.

- The course syllabus, homework, and supplementary material such as old solved exams will be posted on the class website

<http://www.math.utah.edu/~treiberg/M3210D.html>

The syllabus and course materials will also be posted on canvas. Other sensitive materials such as grades and recordings of our meetings will also be available on the course canvas page for Math 3210-001.

<https://utah.instructure.com/courses/>

Class announcements will be done via email. You will be responsible for any information contained in them as well as the information announced in class.

- It is your responsibility to also regularly check your Umail (make sure

you set up forwarding if you do not check it regularly), your Umail is the only way for me to communicate privately with you, there will be occasions during the semester that we may need to reach out to you individually (e.g. regarding a grade or assignment) and it is in your best interest to respond promptly.

- Feel free to contact me by email for questions at
treiberg@math.utah.edu

This is the only email address that I will respond to. I will do my best to answer emails sent to this address promptly. If you use the canvas Inbox it may take a week for me to respond. I would like to encourage you to email me only if it is something personal that requires individual attention. If instead you have questions about logistics of the class, course material and assignments, and anything else your classmates may wonder as well, please ask me in class.

- I will always do my best to ensure the communication relevant to the course is clear and transparent, it is your responsibility as well to keep yourself updated by regularly checking your university listed email.

- Course Canvas Page: Students are expected to log in and check the course home page

<http://www.math.utah.edu/~treiberg/M3210D.html>

and canvas regularly for posted announcements, assignments and handouts. Zoom meetings will be held through the canvas page.

I. NETIQUETTE - EXPECTATIONS FOR ONLINE LEARNING ENVIRONMENT

Here are some norms of communications for online settings.

- Classroom equivalency: Respectful participation in all aspects of the course will make our time together productive and engaging. Zoom lectures, discussion threads, emails and canvas are all considered equivalent to classrooms and student behavior within those environments shall conform to the student code. Specifically:

- Posting photos or comments that would be off-topic in a classroom are still off-topic in an online posting.
- Disrespectful language and photos are never appropriate.
- Using angry or abusive language is not acceptable, and will be dealt with according to the Student Code. The instructor may remove online
- Do not use ALL CAPS, except for titles, or overuse certain punctuation marks such as exclamation points and question marks.
- Course e-mails, e-journals, and other online course communications are part of the classroom and as such, are University property and subject to the Student Code. Privacy regarding these communications between correspondents must not be assumed and should be mutually agreed upon in advance, in writing.

- Other expectations for online communication (on Discussion Board, Emails, Zoom chat etc.):

- Emails: When emailing your Instructor and Teaching Team keep a professional tone (e.g. Use a descriptive subject line, avoid "Hey" and always use your professors proper title: Dr. or Prof., Sign your

message with your name and return e-mail address. Please consult this page for tips on how to write appropriate professional emails:

<https://academicpositions.com/career-advice/how-to-email-a-professor>

- Treat your instructor, teaching team and classmates with respect in email or any other communication.
 - Remember that all college level communication should have correct spelling and grammar (this includes discussion boards).
 - Avoid slang terms such as "wassup?" and texting abbreviations such as "U" instead of "you"
 - Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post and your message might be taken seriously or be offensive to others.
 - Be careful with personal information (both yours and others).
- Electronic or equipment failure: It is your responsibility to maintain your computer and related equipment in order to participate in the online portion of the course. Equipment failures will not be an acceptable excuse for late or absent assignments.
- Online submissions: You are responsible for submitting the assignment with the required naming convention, correct file extension. Homework will normally be submitted as a single pdf file. The file name should be your name and assignment number, e.g., "Gates_HW6.pdf" and not "math homework.pdf".
- Canvas allows students to change the name that is displayed AND allows them to add their pronouns to their Canvas name. Additionally, students can indicate their pronouns in Zoom.

J. ASSIGNMENTS, ASSESSMENT & GRADING

Here are some details about course grading.

Best two of three midterms 40% + HW 30% + final 30%.

- The total score is the weighted sum of the best two of three midterms, the homework and the final. The best of three midterms will be weighted 40%, the homework 30% and the final 30%. Grades will be assigned by the schedule above, which is based on my experience of previous classes. If the total score is at least S then grade will be as in the table. For example if a student receives 56/100, 71/100, 42/100 on midterms so that the sum of the best two is 127, a scaled total 140/150 on homework and 110/150 on the final, then her weighted total will be

$$127 + 141 + 110 = 378$$

which earns her the grade A-. Note that the percentages of grades computed by Canvas is at best an approximation of your grade.

- The midterms and final will consist of in-class exams.

There will be three midterm exams on Wednesdays Feb. 1, Mar. 1 and Apr. 5. These exams are to be completed during the class period. The midterm score will be the sum of the best two midterm scores. Their total weighting in the final score is 40%. Students will be able to submit an optional analysis of their midterm exams on the class day after exams are returned. The analyses will be a discussion and corrections of two exam problems. For each analysis the student may earn up to an additional 10 points added to their exam score.

- Students seeking academic accommodations should contact me and make necessary arrangements before the first exam. Students will have to arrange an alternative with me beforehand if they are unable to take the exam at the scheduled time. Otherwise, except in extraordinary circumstances, no makeup exams will be given.

The final exam will be half on the material since the last midterm and half comprehensive. Students will not be able to submit an analysis of the final. Students must take the final to pass the class.

Homework will be assigned weekly. The homework problems will be listed on the class webpage. Students may discuss homework with each other, but are expected to write up assignments on their own. Copying from another student or from the internet is cheating and will be treated as academic misconduct. If you use any reference other than the textbook, you are expected to quote the reference in full and provide a complete citation. Refer to the American Mathematical Society style guide

<https://www.ams.org/publications/authors/AMS-StyleGuide-online.pdf>

or the APA, MLA or Chicago styles recommended by University of Utah Writing Program

<https://writingcenter.utah.edu/writing-resources/index.php>

- The Mathematics Department strongly recommends an in-class final for all undergraduate classes. Students must take the final to pass this class. The final exam will be held in the normal classroom. It will be given during the final exam period according to the University final exam schedule.

- Students should check their grades and notify me if they notice any mistake. For instance, it is the student's responsibility to ensure the accuracy of all recorded homework, analyses, online assignments, and exam grades. Also you should keep as record all your graded assignments. If you see any error in your grades on Canvas, reach out to the instructor as soon as possible, or at the latest within two weeks from when the assignment was returned.

Late Assignments/Missed Assignments/Regrading Policies:

- Homework will be due every Friday at 4:00pm. Homework that is late but not more than one week late will receive half credit. Homework that is more than one week late will receive no credit at all. If there are any queries on homework, please write your question and send it to me with a copy of the homework and its grading. I will forward your query to the grader.

Incompletes: According to university policy, to be considered for an incomplete, a student must have 20% or less of the course work remaining and be passing the course with a C or better. You must request an incomplete grade and I will consider giving that grade only under exceptional circumstances.

K. ACADEMIC CODE OF CONDUCT

Students 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. Incidents of academic misconduct (e.g. cheating, plagiarizing, misrepresenting one's work, and/or inappropriately collaborating on exams) will be subject to penalty per Section V of Policy 6-400, the Student Code. Incidents of academic dishonesty on homework assignments will result in a minimum penalty of a full letter-grade reduction and up to a failing grade (E) for the course. Incidents of academic dishonesty on exams will result in a minimum penalty of a failing grade (E) for the course, and the incident(s) will be referred to the dean of your major-department college for possible further sanction.). I endorse the Chemistry Department's Code of Conduct at this link

<https://csme.utah.edu/chemistry-code-of-conduct/>

L. ADDITIONAL POLICIES AND RESOURCES

Inclusivity Statement: It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that student's learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, and veteran status, and other unique identities. gender, sexuality, disability, age, socioeconomic status, ethnicity, race, culture, and other unique identities. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

<https://csme.utah.edu/sample-inclusivity-statements/>

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 and Affirmative Action, 135 Park Building, 801-581-8365, or Office of the Dean of Students, 270 Union Building, 801-581-7066. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS). Please see Student Bill of Rights, section E

<http://regulations.utah.edu/academics/6-400.php>.

I will listen and believe you if someone is threatening you.

Names/Pronouns. Canvas allows students to change the name that is displayed AND allows them to add their pronouns to their Canvas name. 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 honor you by referring to you

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 pronoun are respected. If you need any assistance or support, please reach out to the LGBT Resource Center.

https://lgbt.utah.edu/campus/faculty_resources.php

English Language Learners. If you are an English language learner, please be aware of several resources on campus that will support you with your language and writing development. These resources include: the Writing Center

<http://writingcenter.utah.edu/>

and the Writing Program

<http://writing-program.utah.edu/>

and the English Language Institute

<http://continue.utah.edu/eli/>

Please let me know if there is any additional support you would like to discuss for this class.

Undocumented Student Support. Immigration is a complex phenomenon with broad impact on those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit

dream.utah.edu.

Veterans Center. If you are a student veteran, the U of Utah has a Veterans Support Center located in Room 161 in the Olpin Union Building. Hours: M-F 8-5pm. Please visit their website for more information about what support they offer, a list of ongoing events and links to outside resources:

<http://veteranscenter.utah.edu/>

Please also let me know if you need any additional support in this class for any reason.

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 801-581-7776 or

www.wellness.utah.edu

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://asuu.utah.edu/displaced-students>

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, 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 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; Director, Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or to 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 police, contact the Department of Public Safety, 801-585-2677(COPS).

Campus Safety: 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.