Math 3210 – 2   Syllabus for Foundations of Analysis I   Aug. 3, 2025

Course Description

Logic, methods of proof, mathematical arguments in mathematical analysis. Rigorous
reconsideration of real number systems, infinite series and the continuity,
differentiation and integration of real number functions of one variable. The
emphasis is on improving the students ability to understand and explain in a
logical and complete manner

Credit Hours: Four

Meeting Time: MTWF 9:40 – 10:30am in LCB 215 – – –

Zoom: MTWF lectures will be held in person and simultaneously
                zoomed. Zoomed sessions will be recorded and notes will be made
                available on Canvas. Contact info for lectures:

                Starting   Jan. 6, 2025, 2:00 PM
                                Join Zoom Meeting

                Zoom contact information is available in the syllabus in canvas.

Canvas Page: https://utah.instructure.com/courses/??????

Instructor: Prof. A. Treibergs (he/him/his)
                Campus Office JWB 224, 581 – 8350.
                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
                Available via Inclusive Access (Bookshelf tab in Canvas)

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* COVID INFORMATION

According to the CDC, wearing a mask remains an effective means of preventing
infection for both unvaccinated and vaccinated people. Regardless of what
someone chooses (mask or no mask), the university seeks to foster a sense of
community and asks everyone on campus to be respectful of individual decisions
on mask wearing. While Utah law prohibits state universities from requiring
COVID-19 vaccinations, all members of the University of Utah community are
encouraged to receive a COVID-19 vaccine.

University leadership has urged all faculty, students, and staff to model the
vaccination, testing, and masking behaviors we want to see in our campus
community. These include:

–   Vaccination
–   Masking indoors
–   If unvaccinated, getting weekly asymptomatic coronavirus testing

Vaccination

Get a COVID-19 vaccination if you have not already done so. Vaccination is proving
highly effective in preventing severeCOVID-19 symptoms, hospitalization and death
from coronavirus. Vaccination is the single best way to stop this COVID resurgence
in its tracks. Many in the campus community already have gotten vaccinated:

        More than 80% of U. employees
        Over 70% of U. students

Visithttp://mychart.med.utah.edu/,http://alert.utah.edu/covid/vaccine,
orhttp://vaccines.gov/to schedule your vaccination.

Masking

While masks are no longer required outside of Health Sciences facilities, UTA
buses and campus shuttles,CDC guidelines now call for everyone to wear face masks
indoors.

Check the CDC website periodically for masking updates
https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.html

Treat masks like seasonal clothing (i.e. during community surges in COVID
transmission, masks are strongly encouraged indoors and in close groups outside).

Testing

If you are not yet vaccinated, get weekly asymptomatic coronavirus tests. This is
a helpful way to protect yourself and those around you because asymptomatic
individuals can unknowingly spread the coronavirus to others

Asymptomatic testing centers are open and convenient:
        Online scheduling
        Saliva test (no nasal swabs)
        Free to all students returning to campus (required for students in
        University housing)
        Results often within 24 hours
        Visit alert.utah.edu/covid/testing

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

Students are encouraged to be vaccinated

>   Vaccination is proving highly effective in preventing severe COVID-19
        symptoms, hospitalization, and death from coronavirus.

>   Vaccinations are available to everyone 12years and older. Appointments
        open in the U of U Health system for patients as well as additional
        vaccine providers throughout Utah.For up-to-date campus vaccination
        information go to: https://alert.utah.edu/covid/vaccine/

Testing and Exposure

The university will continue to follow guidance from the CDC for testing,
contact tracing and exposure management. When an exposure is reported, the
contact tracing team will engage and advise next steps.Please note that
vaccination status is part of the contact tracing protocol.

Students are encouraged (undergraduate and graduate) to take advantage of
university COVID-19 testing services:https://alert.utah.edu/covid-19-testing/.
Voluntary asymptomatic testing will continue to be available weekly for all
members of the campus community. To schedule a COVID-19 test, https://
alert.utah.edu/covid-19-testing/

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

>   If you have been exposed, or are experiencing symptoms, self-report and
        follow university guidelines for exposure.

https://coronavirus.utah.edu/wp-content/uploads/sites/2/2020/11/COVID-19-
Guidance-for-Suspect-or-Confirmed-Cases-and-Close-Contacts-April-27-2021.pdf

>   Follow the Exposure Management Guidelines

https://coronavirus.utah.edu/wp-content/uploads/sites/2/2020/11/Faculty-
Response-for-Student-Report-of-COVID-19-V5.pdf

        for responding to and managing student reports of COVID-19 infection
        including contact tracing and reporting exposure to college and
        department leaders

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.

Additional software/computing requirements: students will be asked to solve differential equations numerically. It does not matter which software is used, but students should start to familiarize themselves with software. e.g., Maple or Macintosh's Grapher.

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.

Holidays: There will be no classes Monday, Sept. 1, Oct. 6-10 (spring break) and N0v27-28 (thanksgiving),

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 the definitions of convergence to approximate by sequences, series, and functions; 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, and

master definitions and produce rigorous proofs of
        results that arise in the context of real analysis, write
        solutions to problems and proofs of theorems that meet
        rigorous standards based on content, organization and
        coherence, argument and support, and style and mechanics.

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.
Students will prepare written solutions to 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 4:00 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.

              The exact homework schedule will depend on how fast
              the class runs. But it will be very similar to homework
              weeks A through N of the spring 2023 class

https://www.math.utah.edu/~treiberg/M3210Dhw.pdf

   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 Sept. 10, Oct. 15 and Nov. 12.

Final Exam: Fri., 8:00 – 10:a0 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 August 18
and ending Dec. 10.

Last day to register is Aug. 22. Last day to add/drop class is Aug. 29. Until
Oct.24 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.
Sept. 10, Oct. 15 and Nov. 12. The final exam is Fri. Dec. 12 8:00 – 10:00am.
The final is at the University scheduled time. Students must take
the final to pass the course.

Holidays: There will be no classes Monday, Sept. 1, Oct. 6-10 (spring break)
and N0v27–28 (thanksgiving),

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/M3014.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 3010-001

https://utah.instructure.com/courses/??????

Class announcements will be done via email or through the Canvas Inbox. 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 and canvas regularly for posted announcements 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 postings that are inappropriate.
- 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?"Â and texting abbreviations such as "U" instead of "you"Â
- 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: My preference is that you submit homework and essays on paper in person. Occasionally you will be allowed to submit papers on line. Please submit files with the required naming convention and 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., "Einstein_HW6.pdf" and not "math homework.pdf".

- Canvas and CIS allow 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 a student receives 57/100, 63/100, 75/100 on midterms so that the sum of the best two is 138, a scaled total 130/150 on homework and 110/150 on the final, final her weighted total will be

157 + 140 + 120 = 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 Sept. 22, Oct. 20 and Nov. 17. 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 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. Students will be able to submit an optional analysis of their midterm exams on the class day after exams are returned. The analysis will be a discussion and corrections of the the exam problems. For each analysis I will increase the test score by up to 10% of the exam.

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, quizzes, 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 AND ADDITIONAL POLICIES AND RESOURCES

Current mandatory University syllabus policies regarding ADA Act, Safety at the U, Addressing Sexual Misconduct, and Academic Misconduct are listed here. They can also be viewed at: https://cte.math.utah.edu/instructor-education/syllabus/institutional-policies.php

Americans With Disabilities Act (ADA)

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities.

All written information in this course can be made available in an alternative format with prior notification to the Center for Disability & Access (CDA). CDA will work with you and the instructor to make arrangements for accommodations. Prior notice is appreciated. To read the full accommodations policy for the University of Utah, please see Section Q of the Instruction & Evaluation regulations. https://regulations.utah.edu/academics/6-100.php

In compliance with ADA requirements, some students may need to record course content. Any recordings of course content are for personal use only, should not be shared, and should never be made publicly available. In addition, recordings must be destroyed at the conclusion of the course.

If you will need accommodations in this class, or for more information about what support they provide, contact:

Center for Disability & Access

  801-581-5020
  disability.utah.edu
  162 Union Building
  200 S. Central Campus Dr.
  Salt Lake City, UT 84112

Safety at the U

The University of Utah values the safety of all campus community members. You will receive important emergency alerts and safety messages regarding campus safety via text message. For more safety information and to view available training resources, including helpful videos, visit safeu.utah.edu.

To report suspicious activity or to request a courtesy escort, contact:

Campus Police & Department of Public Safety

  801-585-COPS (801-585-2677)
  dps.utah.edu
  1735 E. S. Campus Dr.
  Salt Lake City, UT 84112

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, you are encouraged to report it to university officials:

Title IX Coordinator & Office of Equal Opportunity and Affirmative Action

  801-581-8365
  oeo.utah.edu
  135 Park Building
  201 Presidents' Cir.
  Salt Lake City, UT 84112

Office of the Dean of Students

  801-581-7066
  deanofstudents.utah.edu
  270 Union Building
  200 S. Central Campus Dr.
  Salt Lake City, UT 84112

To file a police report, contact:

Campus Police & Department of Public Safety

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  801-585-COPS (801-585-2677)
  dps.utah.edu
  1735 E. S. Campus Dr.
  Salt Lake City, UT 84112
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If you do not feel comfortable reporting to authorities, the U's Victim-Survivor Advocates provide free, confidential, and trauma-informed support services to students, faculty, and staff who have experienced interpersonal violence.

To privately explore options and resources available to you with an advocate, contact:

Center for Student Wellness

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  801-581-7776
  wellness.utah.edu
  328 Student Services Building
  201 S. 1460 E.
  Salt Lake City, UT 84112
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Academic Misconduct

It is expected that students comply with University of Utah policies regarding academic honesty, including but not limited to refraining from cheating, plagiarizing, misrepresenting one's work, and/or inappropriately collaborating. This includes the use of generative artificial intelligence (AI) tools without citation, documentation, or authorization. Students are expected to adhere to the prescribed professional and ethical standards of the profession/discipline for which they are preparing. Any student who engages in academic dishonesty or who violates the professional and ethical standards for their profession/discipline may be subject to academic sanctions as per the University of Utah's Student Code: Policy 6-410: Student Academic Performance, Academic Conduct, and Professional and Ethical Conduct.
https://regulations.utah.edu/academics/6-410.php

Plagiarism and cheating are serious offenses and may be punished by failure on an individual assignment, and/or failure in the course. Academic misconduct, according to the University of Utah Student Code:

"...Includes, but is not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information... It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct."

For details on plagiarism and other important course conduct issues, see the U's Code of Student Rights and Responsibilities.
https://regulations.utah.edu/academics/6-400.php

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.