MTH 415 - Spring 2021
Real Analysis
Course Syllabus

Course information

Room: https://csuohio.zoom.us/j/87222743333?pwd=NkdIRzV0Y3RkOFpqQnZocEkyWmpSZz09

Time: MW 6:00 - 7:50 pm

Credits: 3.0

Prerequisites: A grade of C or better in MTH 281 or MTH 283, a grade of C or better in at least one mathematics course numbered 300 or above, or permission from the instructor.

Description: This course gives a rigorous introduction to the real numbers. Topics include sequences and series, basic topology of the real numbers, functional limits and continuity, the derivative, sequences and series of functions.

Learning outcomes: Successful MTH 415 students will be able to:

- understand and express fundamental concepts of real analysis;
- learn to read and produce mathematical proofs using reasoning and tools common to real analysis;
- exemplify and perform computations with the notions encountered throughout the course.

Online resources: Visit Blackboard for up-to-date information about this course.

Instructor

Name: Federico Galetto (he/him/his; I/me/the instructor, in this document)

E-mail: f.galetto@csuohio.edu

Office hours: Schedule an appointment at https://math.galetto.org/appt

Materials

Notes and other materials will be distributed online. All course materials are copyrighted and cannot be distributed without the permission of the authors.

Required textbook (in either digital or physical format):
- Stephen Abbot, *Understanding Analysis*, 2nd edition, Springer, (print: 978-1-4939-2711-1, digital: 978-1-4939-2712-8). A digital copy can be downloaded for free at http://scholar.csuohio.edu/record=b3028264 (log in with your CSU credentials).

Secondary textbook:
- Jiří Lebl, *Basic Analysis: Introduction to Real Analysis*. A digital copy can be downloaded for free at https://www.jirka.org/ra/.

As this course is delivered remotely, the following equipment is required:
- a computer (Windows or Mac);
- a webcam;
- and a microphone.

Cleveland State University might be able to provide access to some of this equipment. For availability, contact Campus411 All-in-1 or Information Services and Technology. You may also contact your academic advisor for assistance.

Grading

Grade calculation: All grades will be posted online. Your percentage grade will be computed according to the following breakdown and converted to a letter grade as indicated below.

80%	Homework	A	93%-105%	C+	77%-79%
25%	Final exam	A-	90%-92%	C	70%-76%
105%	Total	B+	87%-89%	D	60%-69%
		B	83%-86%	F	0%-59%
		B-	80%-82%		

Homework: You should expect one homework problem to be assigned every day of class and due two days later. Assignments are delivered and collected on Blackboard.

- The following criteria will be considered in the evaluation of your work.
  - Completeness (answers are provided for all problems, reasoning behind answers is fully justified).
  - Correctness (provided answers are correct, reasonings are sound).
  - Insight (into the material showing deeper understanding of the subject).
  - Quality of writing (writing is legible and clearly organized, has proper grammar and correct spelling, contains full sentences, uses mathematical notation correctly).
  - Originality (answers and writing are not a mere copy or rewriting of other's work but show additional independent insight).
- The two lowest assignments will be dropped.

Final exam: Oral final exams will be held by individual appointment in the month of April. You will be expected to know and present on a selection of topics from the semester. More details will be announced in class.

Participation: Active participation is encouraged and can contribute positively to your grade. Such participation includes asking good questions during class, answering questions in class, contributing to class discussions and activities, etc.

Feedback: Feedback on your work will be provided using the comments and feedback tools on Blackboard. Turnaround time for grading will be communicated in class.

Grade appeal: You are responsible for checking feedback on your work, and for ensuring evaluations are reported correctly on Blackboard. Any appeal request must be submitted within one week after a grade is posted.

Policies

Online conduct: The following is expected during all our Zoom meetings.

- All class meetings on Zoom are recorded by the faculty host. Recordings will be made available to students enrolled in the class for later viewing.
- Your Zoom profile needs to include your last name and (preferred) first name. You should also upload a picture of yourself to your profile. You can enter this information on the profile page of your account, after signing in.
- Our Zoom class meetings have a waiting room. Logging into Zoom with your CSU account at https://csuohio.zoom.us/ will allow you to bypass the waiting room. If are not using your CSU Zoom account and are not providing enough identifying information, you may be barred from joining the meeting.
- Your audio should be muted at all times to avoid ambient noise and feedback from your speakers. You may unmute yourself if you have a question.
- You may also ask questions using the Zoom chat function. All chats will be saved (including private chats).
- Class attendance may be taken via built-in Zoom features (such as attendance tracking, polls, etc.).

• Students are not permitted to record or share the contents of the Zoom meetings. Any attempt to do so will be considered a violation of the Student Code of Conduct.

• Please do not share the information on how to access this class with any unauthorized persons. An unauthorized person includes anyone not registered for the class. CSU staff providing academic or technical support, or those providing an approved accommodation to the student are considered authorized persons.

Communication: All communication, outside of class meetings, will be conducted via email. You can reach me at `f.galetto@csuohio.edu`. I strongly recommend using your CSU email account, as email from other accounts is often marked as spam. You can usually expect to receive an answer from me within 24 hours Monday through Friday, or within 48 hours during the weekends.

Attendance: You are expected to attend all classes. If you are unable to attend a class, it is your responsibility to notify your instructor in advance and to inquire about any topics covered and announcements made during that class.

Electronic devices: The use of electronic devices such as (but not limited to) phones, smartwatches, computers, tablets, and headphones is prohibited during class, unless otherwise required (e.g. to connect to a Zoom meeting) or indicated by the instructor.

Excused absences: You may only be excused from class and class related activities in case of university sanctioned activities (such as conferences, competitions, etc.) or in case of medical conditions. With the exception of unforeseen medical emergencies, you must notify your instructor of your absence and present sufficient documentation in advance. Sufficient documentation includes an invitation to attend an event or a doctor's note indicating you cannot attend on the scheduled date.

Extra credit and makeups: There is no extra credit in this class. There are no makeups in this class other than for excused absences. Insofar as circumstances allow, all makeups have to be arranged in advance.

Academic integrity: Cheating and/or plagiarism will not be tolerated. Cheating includes copying or receiving help from another student on quizzes, tests or exams, as well as allowing another student to copy from your work. Receiving help from someone else by using an electronic device such as a mobile phone or a smartwatch constitutes cheating. Copying another student's homework, or allowing someone else to do your homework for you, is also considered cheating. If cheating occurs in a quiz or test, the student will receive a grade of 0 for that component of the course. If a student cheats a second time during the course, the student will receive an F for the course. If cheating occurs on the final exam, the student will receive a grade of F in the course. Any cheating activity may be reported for further action. Information regarding the official CSU Policy on Academic Misconduct can be found at `https://www.csuohio.edu/sites/default/files/3344-21-02_0.pdf`.

Safe space: I am committed to making our encounters (in class, during office hours, in person, and online) feel safe for everyone involved. All participants are expected to conduct themselves in a respectful manner towards other participants and their ideas. Behaviors that are disrespectful or discriminatory towards other individuals or groups of individuals will not be tolerated.

Accommodations: Educational access is the provision of classroom accommodations, auxiliary aids and services to ensure equal educational opportunities for all students regardless of their disability. Students who feel they may need an accommodation based on the impact of a disability should contact the Office of Disability Services at 216-687-2015. The Office is located in BH 147. Accommodations need to be requested in advance and will not be granted retroactively.

Withdrawals: The last day to withdraw is Friday, March 26, 2021. Withdrawing from the course may put a student in violation of the federally mandated standards for academic progress (SAP) that a student must maintain to be eligible for financial aid. Please visit `https://www.csuohio.edu/financial-aid/standards-academic-progress-sap` for more information.

Course modifications: The instructor retains the right to modify the contents of the course, including grading criteria and course policies. Reasonable notice will be given for all time sensitive matters. Course changes will be communicated in class and on Blackboard.

Calendar

Here is a rough calendar for the course. Please note this is tentative and subject to change. References are from Stephen Abbot, *Understanding Analysis*, 2nd edition, Springer.

Weeks	Topics	Reference
1-2	The Real Numbers	§1.1-1.4
3-5	Sequences and Series	§2.1-2.7
6	Basic Topology of **R**	§3.1-3.4
7-8	Functional Limits and Continuity	§4.1-4.5
9	The Derivative	§5.1-5.3
10	Sequences and Series of Functions	§6.1-6.6
11	The Riemann Integral	§7.1-7.5