MATH 311 - INTRODUCTION TO ANALYSIS - SYLLABUS

Instructor: Dennis Kriventsov

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Office Hours: W 18:40-20:00 (tentative)

Meetings: TTh 18:40-20:00, online

TA: Soham Chanda

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Recitation: T 20:10-21:30, online

Textbook

The *required* textbook for this class is Edward D. Gaughan, *Introduction to Analysis*, 5th edition. I believe the 4th edition is very similar to the 5th edition (it lacks some of the projects), and should be fine. I do not have access to earlier editions and cannot vouch for them. It is published by the AMS.

Prerequisites

The official prerequisites for this class are Math 300 with a grade of C or better AND Calculus 4.

Contact Information

I will have a scheduled office hours, held online where I sit in a Zoom meeting and you are welcome to join. You can also talk to me on Thursdays right after class (not Tuesdays because the recitation is right after class on Tuesdays). Outside of this, contact me by email with any questions.

There are two Canvas features you may wish to take advantage of as well: Discussions and Chat. Discussions is like a forum, where you can make topics and post replies. Chat is a really basic online chat. Feel free to use these to discuss material/problems, or to organize out-of-class meetings. I will try to check these regularly.

Topic

The course will mostly deal with limits, continuity, and derivatives of functions of one real variable. Unlike the calculus sequence, the emphasis will be on the rigorous foundations of the subject.

We will cover Chapters 0-4 of the textbook, which discuss the real numbers, limits, continuity, and differentiation.

Class Structure

- We will be using Canvas extensively for all class material. Make sure you are familiar with how to use it. There is more information about technology below.
- The class will take place synchronously online at the scheduled times. The plan is to use Zoom, barring some technical issues.
- The class meetings will consist partly of lecture and partly of group or individual work on problems and worksheets. This means you will need to be able to:
  - use your microphone
  - write on the shared white board
  - write on shared documents
  - access pdf files and other features on Canvas
  - write, scan, and upload as pdf your solutions to problems

  during the meetings. Make sure that you can do these things.
- There will be reading assignments from the textbook. You will need to *actually do the readings*. There will be reading guides posted to help you.
- There will be short reading quizzes at the beginning of each class. They will be worth 15% of the grade.
- There will be weekly homework problems assigned, due Thursday. This will be worth 15% of the grade.
- There will be two midterm exams (23% each) and a final exam (24%).

Objectives

- Be able to read mathematical prose (at the level of a textbook) and understand it.
- Be able to write mathematics, including proofs, proficiently.
- Be able to translate back and forth between rigorous mathematical writing and informal understanding of the underlying ideas.
- Be able to communicate mathematics verbally, at least with the help of some visual aids.
- Engage with the course content to a sufficient level of mastery, including applying it to writing proofs.

Exams

Tentatively, the exam format will be a take-home exam (textbook/notes allowed; nothing else is) followed by a short oral exam. The oral exam will be scheduled for a time slot of 10-15 minutes with me beforehand, and will consist of me asking follow-up questions about your solutions to the written exam. You will need a webcam, microphone, and the ability to write on the online white board for the oral exam.

This is subject to change, pending university and department policy and experience with the system. The most likely change would be an in-class proctored exam portion.

Homework

I will assign a handful of problems, often from the text. You may discuss them with others, but the written solutions must be your own. You should provide *careful, well-written*

solutions; they will generally be proofs. We will discuss in class, frequently, how to write proofs.

Quizzes

There will be reading quizzes at the beginning of each class. The precise format may vary, but make sure you can access Canvas during class.

Technology

More information about technology:

- Class, office hours, and recitation will be held via Zoom. Links to the meetings will be available on Canvas.
- You will need a microphone for class. You will also need to access Canvas, the shared whiteboard, other documents, and possibly upload files. If you are connecting from a computer with a microphone, that should all be possible. If not, make sure you can do these things.
- You are encouraged (but not required) to use the webcam when in class.
- The lecture portions of class will be recorded, and the recordings will be posted on Canvas. This is not a replacement for actually going to class.
- All course materials will be posted on Canvas.
- Take-home exams will be distributed and collected via Canvas; specific details will be announced.
- Homework will be announced on Canvas. The submission method will also be via Canvas, but specific details will be announced later. You may either submit legible pdf scans/photos of handwritten work or typed solutions.
- Quizzes will use either Zoom polls or Canvas quizzes; the latter may require you to scan/photo and submit something.
- Oral exams will *require* you to use a microphone and webcam, and possibly write on paper or a shared whiteboard.

Department advice on scanning documents to pdf using your phone camera: On IOS 11+, go to Notes → any note → + icon above the keyboard → Scan Document → possibly change to b/w from color by tapping icon with three circles in top row. On Android devices (with Google account linked): Google Drive → Add (bottom right) → Scan → take photo, then possibly resize or add more pages → Done.

Some possibly helpful links:

- Canvas: `https://canvas.rutgers.edu`
- Zoom: `https://zoom.rutgers.edu`
- Math department policy on tech: `https://math.rutgers.edu/academics/undergraduate/1599-technology-requirements-for-math-courses-in-fall-2020`
- University information about technology: `https://coronavirus.rutgers.edu/technology-resources-for-students/`
- Some links from the SAS: `https://sas.rutgers.edu/sas-pandemic-resources`

Schedule

The schedule below is provisional, and subject to change.

Dates	Sections
9/1-9/3	0.1-0.2
9/10	0.3
9/15-9/17	0.4-0.5
9/22-9/24	1.1
9/29-10/1	1.2-1.3
10/6-10/8	1.4, Midterm 1
10/13-10/15	2.1
10/20-10/22	2.2-2.3
10/27-10/29	2.4
11/3-11/5	3.1-3.2
11/10-11/12	3.3, Midterm 2
11/17-11/19	3.4
11/24	4.1
12/1-12/3	4.2-4.3
12/8-12/10	4.4

The midterms will not be held in class, but one of the class days on a week with a midterm will be a review/preparation day.

Student Wellness Services

Counseling, ADAP & Psychiatric Services (CAPS) (848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ `www.rhscaps.rutgers.edu/medical-counseling-services/counseling`

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA) (848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / `www.vpva.rutgers.edu/`

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / `https://ods.rutgers.edu/`

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student

with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: `https://ods.rutgers.edu/students/documentation-guidelines`. If the documentation supports your request for reasonable accommodations, your campuss disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: `https://ods.rutgers.edu/students/registration-form`.

Scarlet Listeners (732) 247-5555 / `http://www.scarletlisteners.com/`

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.