

Math 205B: Complex Analysis

Course Syllabus

UC Davis, Spring 2021

Instructor: Dan Romik

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1 Summary

- **Course instructor:** Dan Romik
- **Course lectures:** MWF 1:10-2:00 (online via Zoom)
- **Office hours:** W 9:00-9:50 (online via Zoom)
- **Course assignments:** one graded homework assignment and a final project
- **Course prerequisites:** MAT205A

2 Course textbook

- The course will be based on my lecture notes *Topics in Complex Analysis*, available to download from the course web page.

3 Course topics

- The Riemann zeta function and the prime number theorem (Chapter 2 in the lecture notes)
- Conformal mapping and the Riemann mapping theorem (Chapter 4 in the lecture notes)
- Elliptic functions (Chapter 5 in the lecture notes)

- Modular forms (Chapter 6 in the lecture notes)
- Other topics as time permits

4 Learning objectives

- Learn advanced topics in complex analysis that will expose you to new mathematical horizons.
- Become a better mathematician through tackling complicated arguments, reading and writing proofs with subtle details, and getting feedback on your writing.
- Develop an appreciation for the interconnectedness of many different areas of mathematics through seeing the interaction of complex analysis with number theory, harmonic analysis, probability and other areas.
- Practice LaTeX and (optionally) computer math skills.

5 Grading policy

The course grade will be based on one homework assignment and a final project.

- **Homework assignment:** a main goal of the assignment is to get you to practice mathematical thinking and writing, and offer feedback on your writing. (Another main goal is to get you to think about the course material, naturally.) The scope of the assignment will be around 3–5 pages of typed solutions in LaTeX. Permission may be given to submit a handwritten assignment — please ask me if there is a reason why you would like to do that.
- **Final project:** a writing project with a length of 5-10 pages (in LaTeX) to expand your knowledge on some complex analysis topic, and practice writing mathematics with precision and clarity. Project topics will be individual and will be decided on in consultation with me at some point during the second half of the quarter. I will offer a list of possible project topics, but feel free to propose your own if there is a particular topic you're interested in (e.g., related to a research specialization you're interested in pursuing).

Additional notes:

1. Some project topics may involve computer experimentation or programming using SageMath, Mathematica etc. This could come as a substitute for some of the writing part of the project; please ask me if you may be interested in a project of this type.

2. Some project topics may be suitable as a gateway into genuine research projects (including ones that could continue beyond the Spring 2021 academic quarter). Please ask me if you may be interested in a project of this type.

The topic of the course is quite subtle and I will not claim it is an easy course to understand. But if you are conscientious in following the material and doing the assignments at a good level, I will give you a final grade of A- or A (or A+ in exceptional cases). If your assignments are not at a good level, I will offer you feedback and give you an opportunity to resubmit the relevant assignment within 1–2 weeks to allow you to bring them up to that level.

6 Ethics policy

Any work submitted as part of the course assignments must: (i) be physically written/typed by you; (ii) be written in your own words; and (iii) represent that you have taken a significant intellectual part in its creation and understand what you have written, unless explicitly specified otherwise. (If you have any doubts about what that means in some particular context, feel free to ask me for clarification.)

Failure to adhere to these guidelines would be considered by me as a violation of the [UC Davis Code of Academic Conduct](#) and warrant, at minimum, a failing grade in the assignment in question and a referral to Student Judicial Affairs.

To put the above in more human terms: don't cheat; treat me and your fellow students as you would like to be treated.

7 Students with disabilities

If you are entitled to some form of accommodation, e.g., based on a disability, please let me know so that we can discuss any relevant logistical details. Please refer to the [Student Disability Center](#) with questions about accommodations.