

Math 336, (Honors) Advanced Calculus

Lecture:	Zoom: MWThF 10:30
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Text:	<i>Complex Analysis</i> (required)
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I don't know how this quarter will go. It's already been shortened since there will be no homework due in the first week. This outline is sure to be modified.

Math 336 is an introduction to complex analysis. I plan to cover the basics: complex numbers, complex functions, analytic and harmonic functions, sequences, series, elementary functions, complex integration, Taylor and Laurent series, residue calculus, harmonic functions, infinite products, gamma function, and zeta function. I hope to give a complete proof of the prime number theorem as the highlight of the course. This proof is a beautiful version of what was once an extremely complicated argument.

As part of the course, I will ask you to write an expository paper on a mathematical topic of your choosing. This paper should read somewhat like a book review. The source material should come from a mathematical journal or similar source. During the quarter, I will post links on the 336 website to papers that I think are suitable. I have posted some links on the 334 and 335 website that are also recommended. I will also suggest journals that have articles that can be read by students at your level. If none of the suggestions I make appeal to you, I am open to your own suggestions. The topics need not be related to the material of 334/5/6 (for example combinatorics or number theory might appeal to you). In any case, I want you to discuss your choice with me before proceeding. I'd like you to make this choice before Monday, May 4. The final paper will be due on Friday, June 5. This paper will count 20% of your course grade.

Homework will be due on canvas to Jordan on Tuesdays at 10:30 am and will count 30% of the course grade. You might find the homework this quarter to be harder than previous quarters. We are starting to function at the senior, early graduate, level now. We will rely on our knowledge of basic results in real analysis. Don't be discouraged if you find them difficult. A quote of Thomas Edison: "I haven't failed. I've just found ten thousand ways that won't work."

There will be two take home more difficult problem sets. The first one will count 20% of the course grade and the second (due during exam week) will count 30% of the course grade. You may work with others, but should indicate on your partners on your submitted solutions.

I would like you to read most of chapters I-X, and XIV, but I will only assign homework up to chapter VIII. I can't predict how the quarter will go.

Here are the homework assignments (they may be modified) :

DATE	ASSIGNMENT (from Gamelin)
Apr 7	I.1: 6, 7; I.2: 6, 7; I.7: 4, 5
Apr. 14	I.8: 7; II.1: 6, 14, 19; II.2: 4, 6
Apr. 21	II.3: 3, 4, 5, 6, 8; II.4: 5, 7, 9; II.5: 2, 4; II.7: 8, 9, 10
Apr. 28	III.1: 6; III.3: 2, 4; III.4:1: 3; III.5: 5, 7, 8
May 1	MIDDLE Problem set
May 5	IV.1: 4, 8, 9; IV.2: 5; IV.3: 1, 6
May 12	IV.4: 2; IV.5: 1, 2, 4; IV.6: 2; V.2: 7
May 19	V.3: 3, 4; V.4: 13, 14; V.6: 6; V.7: 5, 7, 10
May 27	VI.1: 5, 7; VI.2: 10, 11, 12; VII.1: 3c, 4; VII.2: 5, 8, 9
June 2	VII.3: 2; VIII.1: 1, 2; VIII.2: 1, 3; VIII.3: 1
June 5	term paper
June 10	FINAL Problem set

Monday, May 25, is a holiday.

These assignments are due at 11:00 am on the due date.