



MATH 505 – Complex Analysis

Fall 2021 Instructor: Gökhan Göğüş

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G051

Office hours: by appointment

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This course provides an introduction to the theory of functions one complex variable. This introductory course for beginning graduate students leads to further topics in complex analysis such as theory of function spaces, Riemann surfaces and analysis in several complex variables. The course starts with basic concepts of complex numbers and complex differentiable functions. On the way, the theory is developed through Cauchy's Integral, residues and Laurent series, Schwarz Lemma and a discussion about normal families, Riemann Mapping Theorem.

Lectures

Monday 9.40-11.30 FENS L030, Wednesday 16:40-17:30 FENS L056.

Textbook

R. E. Greene and S. G. Kranz, *Function theory of one complex variable*, 2nd ed. (2006) Graduate Studies in Mathematics 40, American Mathematical Society, ISBN: 0-8218-3962-4

We will cover chapters 1, 2, 3, 4, 5, and most of chapter 6 of the book.

Further reading and other reference

W. Rudin *Real and Complex Analysis*, 3rd ed

J. B. Conway *Functions of One Complex Variable*, 2nd ed

L. V. Ahlfors *Complex Analysis*

Course Outline

Analytic functions, Cauchy Riemann equations, conformal mappings. Cauchy integral formula. Power series and Laurent expansion. Residue theorem and its applications. Infinite products and Weierstarss theorem. Global properties of analytic functions, analytic continuation.

Homework. During the semester you will be responsible for homework. All homework should be done individually. Your solutions of homework will be collected and they will be graded. Moreover, you will be asked to present the solutions of some problems in class. There is no make up for homework. However, the best 3 homework out of 4 will count as your homework grade; overall homework is 60% of your total grade.

Exam. There will be one exam during the semester. There is absolutely no make up for the exams. The dates of these exams will be decided in class.

Attendance	I expect students to attend classes.	-10%
Best 3 Homework		60%
Midterm		40%

Attendance: Students are strongly advised to attend all the lectures. If a student does not attend 10 hours of lectures, this may result in loss of total points up to 10 points out of 100. Note that there are 3 hours of lectures in one usual week.

Makeup Policy

If you miss the exam, you must contact me and explain your excuse as soon as possible. If it is a health problem you must bring your doctor's report, which is given or checked by SU Health Center, as well. In case you are unable to visit me, you, a friend or a relative should somehow (e-mail, phone, etc.) let me know about the situation.

There will be a make-up for the midterm for those who have a valid excuse for not taking this exam. The time of the makeup will be announced towards the end of semester.

Academic Honesty

I expect students to follow common-sense practices during the exams and all course activities. Cheating will not be tolerated. The action against such violations could range from getting a zero on the particular exam to explaining your case in front of the Disciplinary Committee.

<http://www.sabanciuniv.edu/tr/yonetmelikler>

Course Schedule: Roughly these topics will be covered in each week.

Dates	Section Readings (weekly)	Homework/Midterm (H/M)
Sep 27	1.1-1.4 Complex numbers, CR eqns	
Oct 4	1.5, 2.1-2.3 Complex integration	
Oct 11	2.4 Cauchy's Integral Theorem	
Oct 18	2.5, 2.6 Cauchy's Integral Formula	
Oct 25	3.1-3.3 Applications of CIT	
Nov 1	3.4-3.6 Liouville's Theorem	H1
Nov 8	4.1-4.3 Laurent series	
Nov 15	4.4, 4.5 Residues	H2
Nov 22	4.6, 4.7 More residues	
Nov 29	5.1, 5.2 Zeros	
Dec 6	5.3-5.5 Schwarz Lemma	H3
Dec 13	6.1-6.2 Biholomorphic maps	
Dec 20	6.3-6.5 Riemann Mapping Theorem	
Dec 27	Overall Review	H4 (last week of classes)

Add-drop period: 5-6 October 2021.

My weekly schedule

	Mon	Tue	Wed	Thu	Fri
8.40-9.30					
9.40-10.30	Math 505				
10.40-11.30	Math 505				
11.40-12.30	Office hrs		Math 305/573		
12.40-13.30					
13.40-14.30					
14.40-15.30					
15.40-16.30	Math 305/573				
16.40-17.30	Math 305/573		Math 505		
17.40-18.30			Recitation		
18.40-19.30					