Intro to Complex Variables

MATH 4342.001 | Fall 2023

Instructor: Dr. Deborah Koslover

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Classroom: RBN 4027

Meeting Time: MWF 1:25 – 2:20 PM

Office Hours: MWF 10:40 – 11:40 AM or by appointment.

Course Description

Amazingly, Complex Variables allows us to solve real world problems using imaginary numbers which can't be solved analytically using just real numbers. We will start by studying background theory which give us the tools needed to solve these problems.

We will study functions with complex variables. Emphasis will be given to analytic functions, diffentiation, integration and series expansion.

The pre-requisite is a grade of C or better in MATH 3425 Foundations of Mathematics and MATH 2415 Multivariate Calculus.

Textbook

Complex Variables and Applications, by Churchill and Brown, McGraw Hill
The math department will give you a copy of this book. You do not need to buy one unless you want. I will update you later on which edition.

Website

You will be using Canvas. Go to www.uttyler.edu/canvas to log into Canvas using your regular patriots account. If you have enrolled in the course, you should have access to the website. You will find important documents, grades, lecture notes, and announcements on Canvas.

Attendance is mandatory and attendance records will be kept. Notify Dr. Koslover in advance if you must miss a class, be late for a class or leave early. (Official University Policy: Class attendance is the responsibility of the student. When a student has a legitimate absence, the instructor may permit the student to complete missed assignments. In many cases class participation is a significant measure of performance, and non-attendance may adversely affect a student's grade. When a student's absences become excessive, the instructor may recommend that the student initiate a withdrawal.)

Learning Outcomes

At the conclusion of this course, you will be able to

1. Extend your skills in elementary calculus to the complex plane and define elementary functions to the complex plane
2. Understand the algebra and geometry of complex numbers and the complex plane.
3. Grasp the ideas of continuity, analyticity and the multi-valued nature of (some) functions of a complex variable. Give examples of analytic functions, harmonic functions and contours.
4.   Understand the theory of analytic functions, including all major theorems.
5. Master formal proofs of fundamental complex analysis results.
6. Evaluate integrals and series using complex methods that could not be evaluated with Calculus.
7. Apply the theory of analytic functions to problems in science and engineering.

Course Evaluation

At the end of the semester, you will find your final grade on my.uttyler.edu. It will also be posted on Canvas.
A final course grade of

   90% is guaranteed to be at least an A
   80% is guaranteed to be at least a B
   70% is guaranteed to be at least a C
   60% is guaranteed to be at least a D.

All grades below 60% will be F.

Pie chart labels: Presentations 15%, Test 1 15%, Test 2 15%, Test 3 15%, Test 4 15%, Final 25%
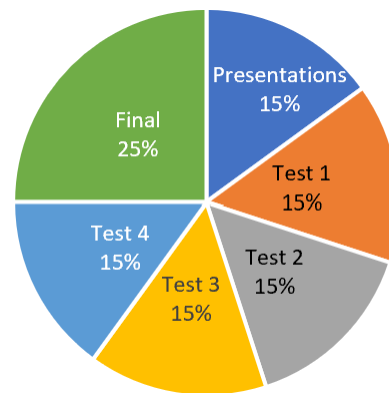
The Plan

Presentations (15%) Homework will be assigned daily. Assignments will appear on Canvas. Homework, in the form of presentations, will be due one week after it is assigned. Students will be asked to get up and present one or two problems. You may show your paper on the overhead projector or start from scratch and demonstrate by writing what you did. You will be graded on correctness of work, clarity of presentation and   your answers to questions asked.

Each student will be allowed one "pass" per class but will receive a zero on the assignment if they ask for two passes.

Students watching the presentations will be awarded points for insightful questions or comments. If you have done a problem in a significantly different fashion than the presenter, you may ask to show your solutions for credit.

Solutions will be posted on Canvas. Do not sell them to Chegg or similar websites. Do not pass down to future generations of students.

TESTS There will be three tests (15% each) and a final exam (25%). These exams will test your knowledge of the material taught in the class and practiced on the homework. Test problems will be similar to homework problems, but generally shorter. The final exam will be comprehensive, but will emphasize material in the final third of the course.

The dates and times of these exams are as follows:
- **Test 1**: Friday, September 8, 2023
- **Test 2**: Friday, September 29, 2023
- **Test 3**: Friday, October 27, 2023
- **Test 4**: Friday November 17, 2023

FINAL EXAM

Final Exam: Monday, December 4, 2023, 12:30 – 2:30 PM

Make-ups

Make-ups for **documented** absences that are **required** as part of a UT Tyler obligation (e.g. athletes participating in an event, participating in a debate contest, etc.) or for religious observation will be granted. For all make-ups of this type, prior notification of at least one week and documentation are required. Other make-ups are granted only in extreme cases such as hospitalization and at the sole discretion of the instructor.

Make-ups will be allowed for the following excused absences.
1) Illnesses, with a doctor's note, no exceptions.
2) Your child's illness, with a doctor's note.
3) Court appearances, including citizenship court, with documentation
4) Weddings, funerals or military advancement with documentation **and** a photograph showing that you attended the event.

Other Details
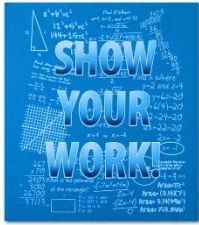
Calculator Policy: Non-graphing calculators may be used on tests. You may not use your phone. However, all work must be shown.

Cell phones, IPODs and other electronic devices: Please set your cell phones and pagers to silent mode. If you are expecting an emergency call, please notify the instructor in advance, sit near the door, and answer the phone outside. You will not be allowed to wear an IPOD or other electronic devices during an exam. During tests, cell phones must be turned off and placed in sight on your desk.

Calendar

AUGUST

MON	WED	FRI
21	23	25
First Day		
28	30	

December 4
Final Exam
12:30 - 2:30 PM

SEPTEMBER

MON	WED	FRI
		1
		Census date
4	6	8
Labor Day		Test 1
11	13	15
18	20	22
25	27	29
		Test 2

OCTOBER

MON	WED	FRI
2	4	6
9	11	13
16	18	20
23	25	27
		Test 3
30		
Drop Day		

NOVEMBER

MON	WED	FRI
	1	3
6	8	10
13	15	17
		Test 4
20	22	24
Thanksgiving		
27	29	Dec 1