MATH 3146 – Section 001
Complex Variables
Fall 2020

Instructor:
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Meeting: MWF 1:25 - 2:15 pm EDT via Blackboard Collaborate via HuskyCT
Live class discussions at the above times will be recorded and recordings will be posted in HuskyCT.

If you cannot meet at the course's regularly scheduled time due to changes in your living situation during the pandemic, please contact Prof. Rizzie to determine what arrangements can be made.

Office Hours: Monday 2:30-3:30 pm
Wednesday 4-5 pm
Thursday 1:30-2:30 pm
or by appointment (i.e., email me if you cannot make it at the above times)
Office hours will be held online in Blackboard Collaborate via HuskyCT.

Text: *Complex Variables and Applications,* 9th Edition, by James Ward Brown and Ruel Churchill

Prerequisites: MATH 2110 and 2410, or MATH 2420 or MATH 2144. Not open for credit to students who have passed MATH 5046.

Goals & Expectations: The goal for the semester is to learn, understand and be able to work with the main ideas of complex variables and functions, including Functions of a complex variable, integration in the complex plane, conformal mappings. This means that you should not only be able to work through problems similar to those done in class and on the homework, but also that you should be able to articulate the ideas presented in the course in a clear and coherent manner. This course will have concrete and abstract components. Being able to explain why something is true will constitute a significant part of the course.

Students will develop a conceptual understanding of the course material in an inquiry-based classroom, which requires a lot of independent work, group work, and class discussions. There will be no lecture.

Participation: The best way to learn math (or anything, for that matter) is to practice it actively. You will spend the vast majority of your time in class working on problems with your peers and talking to others about your solutions to problems. Therefore, your participation is crucial to everyone's learning.

If you have an extenuating circumstance that requires you to miss class, you are expected to contact me as soon as possible once you know that you will miss class so that we can arrange another way for you to engage with the missed day's material.

Each student in this class is vital to the success of the classroom community, which why it is important that we all respect each other, carefully consider one another's ideas, and value each other's contributions. I am very serious about helping to create a classroom environment in which anyone feels free to ask questions, raise concerns, make mistakes, celebrate successes, and so on. You are expected to behave courteously and respectfully to your classmates and to me, but please do not stop yourself from asking a question because you fear it will sound stupid or obvious. We are all here to learn together, which means we will struggle often.

Homework: You will be given a list of problems each week that are recommended for you to complete; however, homework will not be collected on a regular basis. Instead, you will choose from this list some problems to present your solutions to the class, and some problems to post your solutions in your group discussion board for feedback.

In-Class Presentations: For a passing grade, each student must successfully present at least one solution to a homework problem live during class. For grades higher than D, you will need to present more solutions in class. You will be provided a rubric for these presentations, a sign-up sheet to volunteer to present problems in advance, and your group will support you during class to polish your presentation before you present. If your presentation is not successful the first time, then you may try again during the following class meeting.

Discussion Board Posts: For a passing grade, each student must successfully post and revise at least five solutions to homework problems in their group's HuskyCT discussion board. You may choose to do this in written or video form. For grades higher than D, you will need to present more solutions in class. You will be provided a rubric for these posts, and your group members will be required to support you in revising posts.

Responses to Presentations and Discussion Board Posts: For a passing grade, each student must respectfully and productively respond to at least one in-class presentation and at least 8 discussion board posts. For grades higher than D, you will need to respond to more presentations and more discussion board posts. You will be provided a rubric for these responses.

Grading Policy: Your graded work will be returned to you in a timely manner, usually within a week. If you believe there is a grading error, please email me or talk to me privately in office hours during the week after it is returned in order to resolve it. One week after each exam grade is posted, the grade is final.

Exams: There will be two midterm exams, tentatively scheduled for the following days during class: **Monday, October 12 and Wednesday, December 2.** Please plan to be available during class time on those days.

The final exam will be comprehensive and will be scheduled by the university during the university's **Finals Week, December 14-20.** The scheduled time will be announced in class and posted in HuskyCT once the exact date and time are known.

There will be no make-up exams except in extenuating circumstance; if you must miss an exam, please contact me as soon as you know you will miss it. To reschedule or make up the final exam, you must contact the Office of the Dean of Students.

Applications Project: If you wish to earn a grade of A or A- in this course, you will need to successfully complete a project exploring applications of complex variables and functions to your major or intended field of work. You will receive more information about this project during the semester.

Grading: In order to devote as much of our time together as we can to your learning, I aim to make your grade in this course straightforward and transparent. Partial credit can often be a source of ambiguity, anxiety, and contention for both students and instructors. Therefore, written work in this class will not be awarded partial credit. Instead, you will need to successfully complete a set number of each type of assignment for the grade you wish to earn. Students who have used similar mastery-based grading systems in the past have reported feeling more in control of their grades and more motivated to work hard. As an instructor, I aim to send you on to your future classes and careers knowing that you have mastered some of the most fundamental concepts of this course; I hope that you will find this gives you the confidence and competence you will need to succeed in the future.

Your final course grade will be determined using the table below, as follows. At the end of the course, I will choose the highest grade for which you have completed **ALL of the requirements.** For example, if you

complete 17 exam problems successfully, post 10 discussion board posts and 16 responses, present 3 times in class and respond 4 times in class, then you will earn a grade of B. However, if you meet all of the above but only complete 12 exam problems successfully, then you will earn a grade of C. Plus and minus grades will be given to students in borderline cases. For example, if you have met almost all requirements for a B grade, but are only short one or two discussion board responses, you will earn a B-. If instead, you are missing one in-class presentation, then you will earn a C+.

Grade	Basics	Exam Problems (out of 20)	Discussion Board		In-Class Presentations		Application Project
			Posts	Responses	Presentations* (see below)	Responses	
A	Complete all "Basics" assignments in HuskyCT	16	10	16	4	4	Required
B		16	10	16	3	4	Not Required
C		13	7	12	2	3	
D		10	5	8	1	2	
F	Given only to students who do not meet all requirements in at least one row above.						

*Every student must give at least one successful in-class presentation. However, discussion boar posts may be substituted for presentations beyond the first at an "exchange rate" of 2 discussion board posts per 1 presentation. For example, you could earn a B with one successful presentation and 14 successful posts.

How to Succeed in this Course: For many of you, this course will involve more conceptual and abstract ideas than you are used to seeing in mathematics classes. This will take some adjustment, and now is the best time to develop the habits that will help you succeed. These include:

- carefully completing all readings and assigned homework before class
- actively participating in class
- actively participating on your group discussion board and on the class discussion board
- engaging with your work and the work of others to revise and improve it
- asking and answering questions to and from your peers and instructor
- focusing on developing the ability to explain your ideas, both verbally and in writing, correctly using the vocabulary defined in the course
- finding your mathematics support community – classmates, office hours, Q center, etc.

Diversity, Equity, and Inclusion: In learning, we must embrace diversity of race, gender, sexual orientation, ability, background, age, beliefs, ethnicity, and other visible and non-visible categories. As your instructor, I will do my best to foster a culture of equity and justice in this class and in the university as a whole. Discrimination will not be tolerated. By joining this classroom community you are committing to taking a growth mindset, which means we will work together to learn from each other and be more compassionate.

Academic Integrity: Please respect your and others' work and academic experience. Cheating will be taken seriously. Examples of things that will be addressed include, but are not limited to, communicating with anyone other than me while any quiz or exam is underway, representing another person's work as your own (this includes work found on the internet or in a solutions manual), or bringing unauthorized materials to any quiz or exam. You are expected to turn in work that reflects your own understanding of the topics. Therefore, your writing should not bear resemblance to that of any other student in the course or to any other sources used, and any ideas used for which any other party had a share in developing should be cited as such. To facilitate this, I strongly urge you to avoid looking up solutions to any of the problems you are assigned to solve, from any source. Consequences for violation of this policy may include, but are not limited to, a score of zero on the assignment, quiz, or exam, a grade of F in the course, or referral to the Academic Integrity Hearing Board. To read UConn's full policy on Academic Integrity, visit community.uconn.edu/the-student-code-appendix-a/.

Tentative Course Schedule

Week 1	Complex numbers and operations
Week 2	Properties of complex numbers, polar coordinates
Week 3	Real-valued functions of a complex number
Week 4	Limits, Continuity; Cauchy-Riemann equations
Week 5	Analytic functions; Elementary complex functions
Week 6	More elementary complex functions
Monday, October 12 (Week 7)	**Exam 1**
Week 7	Differentiation; Integration
Week 8	Contour integrals, Antiderivatives, Cauchy-Goursat Theorem
Week 9	Cauchy Integral Formula; Sequences, Series
Week 10	Laurent series
Week 11	Residues, Singular points; Cauchy's Residue Theorem
Week 12	Classifying isolated singularities
Week 13 (November 23-27)	**Thanksgiving Recess – No Class**
Week 14	Applications of residues; Harmonic conjugates
Wednesday, Dec 2 (Week 14)	**Exam 2**
Week 15	Reading days/final exam review
Dec 14-20	**Final Exam week**