

MATH 535: COMPLEX ANALYSIS I

Izzet Coskun, MWF 2:00–2:50
SEO 423, icoskun@uic.edu

Course Description. Welcome to MATH 535 Complex Analysis I. Complex Analysis is one of the great subjects of modern mathematics. In this course we will explore the basic properties of complex analytic functions and conformal maps.

Goals and Learning Objectives. This course will introduce you to basic properties of complex analytic functions. You will master complex differentiation and integration, Cauchy-Riemann equations, harmonic functions, analyzing zeros and poles of meromorphic functions, Residue calculus, the Riemann mapping theorem and special functions such as elliptic, Gamma and zeta functions. The course should also prepare you to pass the Master's Exam and the complex analysis portion of the Analysis Prelim.

Course webpage. <https://homepages.math.uic.edu/~coskun/math535s25.html>

Venue and time. Lincoln Hall 301, MWF 2:00–2:50

Instructor. Izzet Coskun, icoskun@uic.edu

Drop-in Hours. WF 1:00–2:00 in SEO 423

Credit hours: This course is a graduate class (4 credit hours).

Text. The recommended texts for the course are

- (1) Ahlfors, Complex Analysis
- (2) Whittaker and Wattson, A course of modern analysis
- (3) Remmert, Special topics in complex analysis

There are many other excellent textbooks in complex analysis and I encourage you to explore these texts.

Prerequisites. A solid background in basic analysis including the concepts of limits, continuity, differentiability, Riemann integrals and line integrals. MATH 417 and MATH 533 are helpful.

Requirements. There will be weekly homework, one midterm and one final. The problem sets will be due the Friday of each week. The problem sets and the midterm count for 30% of your grade each. The final counts for 40% of your grade. No late work will be accepted. You may collaborate on the homework problems, but you must write your own solutions and properly acknowledge any help you receive from others. No collaboration will be allowed on the midterm and the final.

Topics. The following is a tentative list of topics that will be covered in the course. Please read the suggested pages in the text book before class.

- Week 1: Complex numbers and complex functions: Chapters 1 and 2 of Ahlfors
- Weeks 2 and 3: Conformal maps: Chapter 3 of Ahlfors
- Weeks 4 and 5: Complex integration: Chapter 4 of Ahlfors
- Weeks 6 and 7: Series and product developments: Chapter 5 of Ahlfors
- Weeks 8 and 9: Dirichlet's problem and the Riemann mapping Theorem: Chapter 6 of Ahlfors
- Week 10: Elliptic functions: Chapter 7 of Ahlfors
- Weeks 11 and 12: The gamma function and the zeta function: Whittaker and Wattson, Chapters 12 and 13
- Weeks 13: L-functions and Dirichlet's theorem on arithmetic progressions
- Weeks 14 and 15: Applications and the prime number theorem

Grievance Procedures. UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. Freedom from discrimination is a foundation for all decision making at UIC. Students are encouraged to study the University's "Nondiscrimination Statement". Students are also urged to read the document "Public Formal Grievance Procedures". Information on these policies and procedures is available on the University web pages of the Office of Access and Equity: <http://oae.uic.edu/>.

Student evaluation of teaching program (Course evaluations). Student evaluations of teaching play a fundamental role in improving course content, format, and delivery (teaching) at UIC. Students are invited to share feedback on the course with the instructor throughout the semester, and should complete the online course evaluation form emailed to them at the end of the semester before 12am on the first day of finals.

Academic Integrity Policy. For written assignments in the course (both homework and daily recap summaries), students are encouraged to work together. However, the final write-up must be done individually. As an academic community, UIC is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community—students, staff, faculty, and administrators—share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students will be handled pursuant to the Student Disciplinary Policy: <http://dos.uic.edu/docsStudent%20Disciplinary%20Policy.pdf>

Religious holidays. Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the student shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance. If the student feels aggrieved, he/she may request remedy through the campus grievance procedure. <http://oae.uic.edu/docs/ReligiousHolidaysFY20152017.pdf>

Disability accommodation. The University of Illinois at Chicago is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at UIC. Students with disabilities who require accommodations for access to and/or participation in this course are welcome, but must be registered with the Disability Resource

Center (DRC). You may contact DRC at 312-413-2183 (v) or 773-649-4535 (VP/Relay) and consult the following: <http://drc.uic.edu/guide-to-accommodations>.

Classroom conduct policy. Towards the goal of making learning as impactful as possible this semester, we will strive to abide by two overarching principles in this class:

- (1) engage in clear and frequent two-way communication regarding my expectations of you, the class workflow, and unexpected challenges arising that may impede your participation in required class sessions, including exams, or timely completion of assignments;
- (2) build an inclusive learning community in which we all abide by the same ground rules and ethical code of conduct. I look forward to connecting with you this fall. I will do my best to support your learning experience by listening to your needs and by conducting this course with compassion, empathy, and patience.

Learning environment. UIC values diversity and inclusion. Regardless of age, disability, ethnicity, race, gender, gender identity, sexual orientation, socioeconomic status, geographic background, religion, political ideology, language, or culture, we expect all members of this class to contribute to a respectful, welcoming, and inclusive environment for every other member of our class. If there are aspects of the instruction or design of this course that result in barriers to your inclusion, engagement, accurate assessment or achievement, please notify me as soon as possible.

Community agreement.

- Be present (turn off cell phones and remove yourself from other distractions)
- Be respectful
- Assume good will
- Challenge with care – approach discussion as a “think out loud”
- Be flexible when things don’t work
- Share helpful tips
- Use preferred names and gender pronouns
- No side conversations
- Be willing to work together
- Be mindful of one another’s privacy –do not invite outsiders into our classroom
- Commit to upholding a class honor code in which we trust one another and engage only in behaviors that reflect our community standards of academic integrity