MAT 421: Complex Analysis (Spring 2022)

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Office Hours: MWF 9:30 – 10:30, MWF 1:00 – 3:00, also by appointment
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COURSE ANNOUNCEMENT


PREREQUISITES: MAT 211, and MAT 321 or PHY 335. Or permission by the instructor. Please talk with me if you have any questions.

HOMEWORK: Regular homework assignments will be given, about once a week. Please ask, if you have questions or need help.

EXAMS: We plan to have two midterm exams and a final exam. The dates will be chosen later.

GRADING: Total (600) = HW (150) + Participation (100) + Mid (2 × 100) + Final (150)

ACADEMIC INTEGRITY: Please note that Canisius College has a Code of Academic Integrity, which can be found at http://catalog.canisius.edu/undergraduate/academics/academic-policies/code-academic-integrity/ It is expected that the work submitted is the result of your own endeavors. It is very much all right to ask for help in understanding the course material, but any homework assignments or exams must be done without outside assistance. This policy will be strictly enforced.

ACADEMIC ACCOMMODATIONS: The Griff Center – Student Accessibility Services (SAS) serves as the College’s advocate for students with disabilities and is responsible for arranging any necessary accommodations and/or supports. A student in need of academic accommodations should contact Student Accessibility Services at (716) 888-2485 or stop by Old Main 317 to arrange a meeting to discuss their needs, the necessary support documentation and to register with the office. Upon registration, including provision of required documentation, SAS will notify the students professors of the necessary academic accommodations via the iAdvise portal. Please note that a student may register for accommodations at any point throughout the semester.
OVERVIEW: MAT 421 studies the theory of functions of a complex variable. The main objects of study are the complex differentiable functions, which behave quite unexpectedly, different from the real differentiable functions. The subject may sound like an exotic generalization of real analysis, but it is not. It is useful in many branches of mathematics, not just analysis, but also number theory, algebraic geometry, and analytic combinatorics. It is also useful in applied mathematics and physics/engineering, including quantum mechanics, thermodynamics, hydrodynamics, and electrical engineering. It should be a nice preparation for those who are considering graduate studies in mathematical sciences or various disciplines in engineering. This course fulfills the “restricted requirement” for MAT majors.

TOPICS: We will follow the textbook Chapters 1 – 10, with some of the topics only lightly treated or skipped. In the below are some of the main topics:

- Properties of the complex numbers (Ch.1)
- Functions; Limits and Continuity; Differentiable/Analytic functions (Ch.2, Ch.3)
- Power series functions; Exponential, Log, Trigonometric functions (Ch.4, Ch.5)
- Contour integrals; Cauchy’s theorem (Ch.6)
- Taylor and Laurent series (Ch.7)
- Residue theory (Ch.8)
- Möbius transformations; Conformal mappings (Ch.10)
- (If time permits ...) Some selected topics from Ch.4 & Ch.9

ADDITIONAL INFORMATION:

- Last day to drop/add courses is Jan 22.
- Excessive absences will certainly hurt your course grade, and too many unexplained absences will lead to an FX grade.
- Homework assignments will be assigned regularly. It is very much all right (and encouraged) to work in groups, but you should write up your homework on your own, in your own words. You should always show your work.
- Some of you may wish to find topics for the Mathematics Seminar (MAT 380-381-480). If you are interested in something related to Complex Analysis (or anything else), please come and talk with me.
- If you have any questions, you are very much welcome to my office (SH 1047).

Difficulties: If you have any personal difficulties (illness, or any emergency), please let me know so that we can make appropriate arrangements.

(*). We are going through a very special and difficult time. Please always take precautions in and out of the classroom, to protect yourself and the others.