

**Math 421 sec 1 - Complex Variables - Fall 2020**  
TuTh 1:00 → 2:15 via Zoom

**Professor:** Eyal Markman

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**Office hours:** Wednesday 3:00 → 4:00 pm, Thursday, 3:00 → 4:00 pm, and by appointment. Office hours are held via Zoom.

**Course Web page:** <http://www.math.umass.edu/~markman/> **Please check it often!**

**Text:** *Complex Variables and Applications*, 8-th Edition, by James Ward Brown and Ruel V. Churchill, McGraw-Hill.

**Prerequisites:** Math 233.

**Homework:** Will be assigned weekly and will be due each Friday, unless mentioned otherwise. You will be asked to upload a scanned PDF copy of your homework on Gradescope. Instructions will be emailed to you. The homework will be graded by a special grader. Due to lack of funds, it will not be possible to grade all the homework problems assigned. A few of the homework problems will be corrected and graded every week. Nevertheless, for your own benefit, you will be asked to hand in *all* the homework problems assigned. Your grade on each homework assignment will be calculated as follows:

70% The grade on the corrected problems.

30% Credit for handing in *most* of the homework problems assigned. Partial credit will be given.

Late homework will not be collected. Instead, your two lowest grades will be dropped.

**Grades:**

Homework–20%

Two Midterms–50% (each 25%)

Final Exam –30%

**First (remote) Midterm:** Thursday, October 1, 7:00 - 9:00 PM.

**Second (remote) Midterm:** Thursday, November 5, 7:00 - 9:00 PM.

**Final:** To be scheduled by the registrar.

**Calculators Policy:** Calculators will **not** be allowed in the exams. Calculators and computers may be used to check answers on the homework assignments. Nevertheless, an unsubstantiated answer will not receive credit.

**See back ...**

## Syllabus:

- 1) Complex Numbers: algebraic and geometric properties, polar form, powers and roots.
- 2) Analytic functions: Differentiability and Cauchy-Riemann equations, Harmonic functions, examples.
- 3) Elementary functions of a complex variable: exponential and trigonometric functions, logarithms.
- 4) Path integrals: contour integration and Cauchy's integral formula; Liouville's theorem, Maximum modulus theorem, the Fundamental Theorem of Algebra.
- 5) Series: Taylor and Laurent expansions, convergence, term-by-term operations with infinite series.
- 6) Isolated singularities and residues. Essential singularities and poles.
- 7) Evaluation of Improper integrals via residues.

If time permits:

- 8) Mappings by elementary functions and linear fractional transformations; conformal mappings.

**Accommodation:** The University of Massachusetts Amherst is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create a barrier-free campus. If you have a disability and require accommodations, please register with Disability Services (161 Whitmore Administration building; phone 413-545-0892) to have an accommodation letter sent to your faculty. Information on services and materials for registering are also available on their website [www.umass.edu/disability](http://www.umass.edu/disability).

**Academic honesty:** Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent ([http://www.umass.edu/dean\\_students/codeofconduct/acadhonesty/](http://www.umass.edu/dean_students/codeofconduct/acadhonesty/)).