Math 421 sec 1 (30269) - Complex Variables - Fall 2019
MWF 11:15 → 12:05 LGRT 202

Professor: Eyal Markman
Office: LGRT 1223G
Office Phone: 545-2788
E-mail: markman@math.umass.edu
Office hours: Wednesday 2:30 → 3:30 pm, Friday, 9:00 → 10:00 am, and by appointment. Office hours are held in 1223G LGRT.
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. 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 three lowest grades will be dropped.
Grades:

Homework–20%
Two Midterms–50% (each 25%)
Final Exam –30%

First Midterm: Monday, October 7, 7:00 - 9:00 PM.

Second Midterm: Thursday, November 14, 7:00 - 9:00 PM.

Final: To be scheduled by the registrar. Make-ups will not be given to accommodate travel plans.

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 . . .

Homework Assignment 1 (Due Friday, September 13)

Section 2 page 5: 4

Section 3 page 8: 1 (a), (b)

Section 4 page 12: 4, 5 (a), (c), 6

Section 5 page 14: 1 (c), (d), 9, and the extra problem:

Use established properties of moduli to show that when $|z_3| \neq |z_4|$, then

$$\left|\frac{z_1 + z_2}{z_3 + z_4}\right| \leq \frac{|z_1| + |z_2|}{||z_3| - |z_4||}$$

Section 7 page 22: 1 (a), 2, 3, 4, 5 (c)

Check our website for likely additional problems.

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 Laurant 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.