Math 421 sec 1 (74125) - Complex Variables - Fall 2014
MWF 12:20 → 1:10 LGRT 171

Professor: Eyal Markman
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Office hours: Wednesday 3:00 → 4:00 pm, Friday, 2:00 → 3:00 pm, 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: Tuesday, October 14, 6:00 - 7:30 PM.

Second Midterm: Wednesday, November 19, 6:00 - 7:30 PM.

Final: Monday, December 8, 1:00 - 3:00 PM, Room: LGRT 121. 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.

Homework Assignment 1 (Due Friday, September 12)

    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 possible 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.