

## MA234 Complex Variables with Applications

**Instructor:** Nikolay S. Strigul

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**Office Hours:** by appointment

**Lectures:** Monday, Wednesday and Friday 12:00-12:50 PM E. A. Stevens 231

**Homework assignments and quizzes:** There will be weekly homework assignments and quizzes.

**Exams:** There will be Midterm and Final Exams.

### Grading:

- Quizzes: 20 %
- Homework assignments: 20 %
- Midterm: 25 %
- Final: 35 %

### General comments:

MA234 is an introductory undergraduate course in complex analysis. The course will start with an excursus to topology that is necessary to understand the complex plane. Then we will consider differentiability, elementary functions and conformal mappings. Finally we will deal with power series and complex integrals. The focus will be on geometric ideas and physical applications.

### Textbooks

- 1) An Introduction to Complex Analysis by O. Carruth McGehee, ISBN: 9780471332336
- 2) Theory of Functions of a Complex Variable by A.I. Markushevich, ISBN: 9780821837801

### Course program:

**Week 1. - Real and complex numbers. Functions.**

**Week 2. - Essential topology.**

**Week 3. - The complex plane.**

**Week 4. - Conformal mappings. Elementary functions.**

**Week 5. - Polynomials and rational functions.**

**Week 6. - Exponentials and logarithms.**

**Week 7. - Complex integrals 1.**

**Week 8. - Complex integrals 2.**

**Week 9. - Power series.**

**Week 10. - Properties of holomorphic functions.**

**Week 11. - Cauchy's theorem.**

**Week 12. - Singularities.**

**Week 13. - The Residue Theorem.**

**Week 14. - Boundary value problems.**