

# Complex Function Theory I

Math 2250, Fall 2010

MWF 11:00–11:50 am

Kassar 105

**Instructor:** Prof. Sergei Treil,  
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**Office hours:** MW 1:00–2:00 pm and by appointment.

**Text:** L. Ahlfors, *Complex analysis*, third edition.

This is a pretty standard course in complex analysis. The topics include

- Analytic function,  $\partial$  and  $\bar{\partial}$ -derivatives, power series, Laurent series
- Contour integrals, Cauchy theorem;
- Removable singularities, zeroes, poles, the maximum principle;
- The generalized Cauchy theorem, Runge's theorem;
- The residue theorem, argument principle, Roche's theorem;
- Using residues to compute real-valued integrals;
- Reflection principle;
- Normal families, the Riemann mapping theorem,
- Harmonic functions, Dirichlet problem, Green's function;
- Canonical products, the Gamma function, the Riemann zeta function;
- the Weierstrass and Mittag-Leffler theorems;
- $\bar{\partial}$ -problem, Cousin problems (probably).

This is only a tentative list of topics. We can add/drop some topics, depending on the progress of the course.

**Grading:** Your grade will be determined by one midterm, the final and several problem sets assigned during the semester.

**Homework:** The homework will be assigned daily. Some of the homework problems will be included in the sets to be collected and graded, others will help the better understanding of the material.

**Notes:** Taking good notes is essential for advanced mathematical classes, in particular for this class. In this course I would like you to learn basics of mathematical note-taking as well. For each lecture I'll assign persons responsible for note-taking. They should take notes, check them after the lecture, and present a neatly written (or typed) version before the beginning of next class. I'll check the notes, correct if necessary, and post it on my home page. This way, at the end of the course, you will have a complete collection of notes, in addition to your own.

Everyone will be a "note-taker" for one of the lectures.