

MATH 213B: FUNCTIONS OF SEVERAL COMPLEX VARIABLES

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Office hours: MW 12-1pm

Lectures: MWF 11-12 in Science Center 310

Text: *An Introduction to Complex Analysis in Several Variables*
by Lars Hörmander

Grading: Course grades will be computed based on a short take-home exam midway through the semester (30%) and an oral presentation at the end of the semester (70%). No homework will be assigned.

Oral presentation: Halfway through the semester, each of you will need to choose a topic related to the course but not covered in lectures and start reading up on it. During reading period, you will give me a one-hour lecture on it.

Syllabus:

- (1) Preliminaries
 - (a) Outline of the differences between \mathbb{C}^1 and \mathbb{C}^n ;
 - (b) Hartogs' Theorem;
 - (c) Review of harmonic functions and discussion of subharmonicity and plurisubharmonicity;
 - (d) The Bergman kernel;
 - (e) Pseudodifferential operators.
- (2) Convexity, pseudoconvexity, and domains of holomorphy
- (3) The $\bar{\partial}$ -Neumann problem and L^2 techniques
- (4) Sheaves and cohomology
 - (a) The Cousin problems;
 - (b) Weierstrass polynomials and the Weierstrass Preparation Theorem;
 - (c) The Cartan and Oka theorems;
 - (d) Subelliptic multipliers and the Kohn multiplier ideal sheaf.
- (5) Stein spaces

Prerequisites: Either you need to have seen rudiments of measure theory, Fourier analysis, and functional analysis as taught for example in Math 212 or else you must have the ability to pick up that on your own in the next few weeks. Let me know if you need suggestions of good books on these subjects.

Course website: www.courses.fas.harvard.edu/~math213b