

Math 502 Section 1 - Spring 2009

COMPLEX ANALYSIS

Instructor: Anna L. Mazzucato
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Course web page: www.math.psu.edu/mazzucat/math502/
Office hours: Monday 12:10-1:10 PM
Additional office hours (for Math 312 students preferably):
Wednesday 12:30 - 2 PM and
Friday 1 - 2:30 PM

Class meets M W F 11:15 AM - 12:05 PM in 113 MCALLISTER.

Course Description: while differentiation of a complex function $f(z)$ of one complex variable can be defined formally as for functions of one real variable, complex differentiability endows f with an extremely rich structure that has no analog in the real-variable context. The course is devoted to explore this surprisingly rich structure, both as a central part in pure mathematics and as a vital computational tool.

Prerequisites: You MUST have completed Math 501 to register.

Textbook (required):

- Elias Stein, Rami Shakarchi, *Complex Analysis*, Princeton University Press 2003.

Excellent reference texts are:

- Lars Ahlfors, *Complex Analysis. Third Edition*, McGraw – Hill 1979
- Walter Rudin, *Real and complex analysis. Third edition*. McGraw-Hill, 1987.

Course topics: Topics in part **1) – 6)** are mandatory and form the material for the Qualifying Exam in Analysis, Part B. Topics in part **7)** will be covered time-permitting.

1) **Basics.**

2) **Holomorphic functions.**

3) **Cauchy's Theorem and Applications.**

4) **Meromorphic functions.**

5) **Plane topology.**

6) **Conformal maps.**

7) **Possible additional topics:**

- (a) Fourier Transform: Paley-Wiener and functions of exponential type.
- (b) The Prime Number theorem.

- (c) Entire functions and Picard's theorem. Riemann surfaces.
- (d) Elliptic functions.

A more detailed list of course topics is available on the course web page and on ANGEL.

Comments: I welcome questions both during and outside class. ALL questions are very useful to both the instructor and the students. I also welcome general feedback about the course. An anonymous feedback form is available on the course web page.

Assignments. There will be weekly or biweekly homework, one in-class midterm, and a comprehensive final exam. Homework will be assigned and collected usually on Wednesday. The homework is due in class, in person. Homework assignments and handouts will also be posted on ANGEL and/or the course web page.

The midterm is tentatively set for Friday March 6.

Grading: Grades will be based on a 10-point scale (for example, A=90%, B=80%). The final grade, an overall assessment of your performance in the course, may be curved.

- HOMEWORK: 30 %;
- MIDTERM: 30%;
- FINAL: 40%.

Policies: Collaborations on homework problems is allowed and encouraged. However, each student must NO collaboration is allowed during in-class tests. Cell phones must be turned off during all class activities.

NO LATE HOMEWORK will be accepted. There will be NO MAKE-UP EXAMS, unless for documented and valid reasons, such as illness. In this case, you must inform me IN ADVANCE of the test.

Academic Integrity: "Academic dishonesty includes, but is no limited to, cheating, plagiarizing, . . ., facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with academic work of other students. . . . A student charged with academic dishonesty will be given oral or written notice of the charge by the instructor. If students believe that they have been falsely accused, they should seek redress through informal discussions with the instructor, the department head, dean or campus executive officer. If the instructor believes that the infraction is sufficiently serious to warrant the referral of the case to Judicial Affairs, or if the instructor will award a final grade of F in the course because of the infraction, the student and instructor will be afforded formal due process procedures." From Policies and Rules, Student Guide to the University Policy 49-20.

Based on the University's Faculty Senate Policy 49-20, a range of academic sanctions may be taken against a student who engages in academic dishonesty.