

Introduction to Functions of One Complex Variable

Math 4520.001/5400.001, Fall 2009, MWF 10:00-10:50, Cury 211

Professor: Dr. Conley, GAB 419, 565-3326, conley@unt.edu. Assignments and announcements will be posted at www.math.unt.edu/~conley.

Office Hours: MW 11:00-12:30, F 11:00-12:00

Text and Prerequisites: The text is *Complex Analysis for Mathematics and Engineering*, fifth edition, by Mathews and Howell. The prerequisites are Math 1710-20 and 2730, the calculus sequence.

Exams, Homework, and Grading: There will be two 100 point midterms, on the Wednesdays of October 7 and November 11, and a comprehensive 180 point final on Monday, December 14, 8:00-10:00. There will also be thirteen problem sets, usually worth 10 points and due Fridays at the beginning of class. There will be no make-up exams, and late homework will not be accepted.

5400: Graduate students enrolled in 5400 will be given some extra weekly problems, and possibly an extra problem on each exam.

Disabled Students: Please let me know of your disability at the end of the first lecture.

Topics: We will begin by going over multiplication of complex numbers in rectangular and polar coordinates. Then we will study differentiability of functions of one complex variable, followed by Taylor and Laurent series and contour integration. We will also discuss conformal maps and Julia and Mandelbrot sets if time permits. We will give some rigorous proofs, but no prior exposure to proofs will be assumed. Concrete examples and calculations will be emphasized.

Chapters 1-2: Complex numbers, functions, and graphs.

Chapters 3-5: Analytic and harmonic functions, power series functions, and the elementary functions such as e^z .

Chapters 6-8: Complex integration, contour integration, and Taylor and Laurent series. These chapters contain many surprising and beautiful theorems and comprise the centerpiece of the course.

Problem Set 1 (due Friday, September 4):

Section 1.2: 1abef, 2cfh, 3, 5, 6

Section 1.3: 1, 2a, 3b, 5, 6ab, 9, 11, 12

Section 1.4: 1abdeh, 2b, 3abcd, 5fg

5400 Problems: 1.3.18, 1.4.4, 1.4.8