## MATH 6321 Complex Analysis

## Spring 2013

## MW 3-4:30 Skiles 256

## Professor Federico Bonetto

## Office Hours: MW 1:30-2:30 in Skiles 133b

If you have problem to meet with me during the scheduled time, email me to set an appointment.

### Syllabus

See online syllabus at MATH 6321. We will coverthe first six chapter of the texbook. This will leave us sometime at the end of the course for topic that may be of intewrest to the students.

### Prerequisite

MATH 4317, 4320

### Textbook

John B. Conway, "Functions of one complex variables I", Springer, 2nd Edition.

### Grading

I will collect HW every 2 weeks for a total of 5/6 HW. On top there will be two in class midterms and a in class final. Midterms and final will be cumulative. The possibility of personal project will be discussed later during the class. The grading scheme will be 15% HW, 35% midterms and 50% final.

### First week

- Material covered
  - I.1 to I.6: The complex Number
  - II.1 to II.6: Metric Spaces and the Topology of C
- Exercises
  - I.6: 4
  - II.2: 4
  - II.4: 5
  - II.5: 4, 9
  - II.6: 1

### Second week

- Material covered
  - III.1: Power series
  - III.2: Analytic function (first part)
- Exercises
  - III.1: 6, 7
  - III.2: 2, 6, 15

### Third week

- Material covered
  - III.2: Analytic function (second part)

- Exercises
  - III.2: 19

**Fourth week**

- Material covered
  - III.3: Analityc Function as mapping. M&#65533;bius transformations.
  - IV.1: Riemann-Stiltjes integral.
- Exercises
  - III.3: 9, 18
  - IV.1: 13, 21,23

**Fifth week**

- Material covered
  - IV.2: Power Series reppresentation of analytic functions.
  - IV.3: Zeros of analytic functions.
- Exercises
  - IV.2: 4, 8, 10, 11
  - IV.3: 8

**Sixth week**

- Material covered
  - IV.4: The index of a closed curve.
  - IV.5: Cauchy's Theorem and Integral Formula
  - IV.6: The homotopic version of Cauchy's Theorem and simple connectivity.
- Exercises
  - IV.4: 3
  - IV.5: 1, 7, 10
  - IV.6: 1, 4, 6, 10

The first midterm will be on Wednesday Febraury 20. Solution set for first midterm of Spring 2009. Here is the solution set for midterm 1.

**Seventh week**

- Review class and midterm.

**Eighth week**

Material covered:

- Midterm solution set.
- IV.7: Counting zeros; the Open Mapping Theorem

Exercises:

- IV.7: 3, 4

**Nineth week**

Material covered:

- Brief introduction to Bloch waves
- V.1: Classification of Singularities.

Exercises:

- V.1: 1, 6, 10, 17

**Tenth week**

Material covered:

- V.2: Residues
- V.3: The Argument Principle

Exercises:

- V.2: 2 (c)(d)(h), 6, 7, 12
- V.3:  2, 7, 8

**Eleventh week**

Spring break

**Twelfth week**

Material covered:

- VI.1: The maximum Principle.
- VI.2: Schwarz's Lemma.

Exercises:

- VI.1: 3, 5, 8
- VI.2: 2, 3, 5

**Preparation material for the second midterm**. Second midterm with solution and final with solution from 2009. Here is the solution set for midterm 2.

**Takehome Final Exam:** the exam is due in my mailbox before Friday 3 at noon.