MATH 305 – Complex Analysis

MWF 12:00-12:50, Swords 328

Syllabus

Instructor: Prof. David Damiano, 341 Swords, 793-2476/3374
e-mail: *ddamiano@holycross.edu* or *dbd@mathcs.holycross.edu*

Office Hours: M 11 AM-Noon, T 2-3 PM, W 10-11 AM, F 10 AM-Noon and by appointment.

Course Home Page: `http://math.holycross.edu/~dbd/math305/math305.html`

Course Materials (available in the College Bookstore): (1) *Complex Variables*, Stephen D. Fischer.

Prerequisites: MATH 242.

Intended Audience: This course is designed for upper division mathematics majors or non-majors with knowledge of mathematics through the department's intermediate level analysis sequence. This course fulfills the department's upper level analysis area requirement.

Complex Analysis: Complex analysis is the branch of analysis that concerns functions of complex (as opposed to real) variables. The introductory material in the subject bears a strong resemblance to the material in Principles of Analysis (MATH 242): basic properties of the complex numbers, sequences, series, limits, continuity, differentiation, and integration. However, it will soon become apparent that while the definitions in the complex case are almost verbatim the definitions in the real case, the consequences of those definitions are unexpected and mathematically rich. This material is covered in the first three chapters of the text: "The Complex Plane," "Basic Properties of Analytic Functions," and "Analytic Functions as Mappings." It will take us roughly two thirds of the semester to cover this material.

The remainder of the semester will be devoted to material on elliptic functions and their properties. Elliptic functions are an important class of functions which generalize trigonometric functions. In particular, elliptic functions are *doubly periodic*, which means they are periodic in *two* directions in the complex plane. The study of elliptic functions naturally leads to the study of elliptic surfaces, which illuminates interesting connections between complex analysis, algebraic geometry and topology. In addition, elliptic functions play an important role in number theory, though we will not be able to explore this connection.

Class Format: Most classes will be lectures. There will be in-class small-group discussions roughly one every other week during the semester.

Homework: There will be weekly homework assignments from the text or handouts. Homework will normally be due on Fridays.

Exams: There will be two hour exams and a comprehensive final exam during exam period. The midterms are tentatively scheduled for the weeks of February 18-22 and April 7-11. Detailed information about the exams will be given out well in advance of the exam. The date and time will be discussed in class.

Final Exam: The final exam is scheduled for **Thursday, May 8, 8:30-11:30 AM.**

Grading: There are several components to the course grade.

Collaborative Assignments	10%
Homework	40%
Mid-term Exam	20%
Final Exam	30%
Total	100%

Academic Honesty: The Department of Mathematics and Computer Science adheres to the College's policy on Academic Honesty, which may be found in the 2007-2008 College Catalogue. In addition, the department has formulated the attached statement intended to amplify the policy as to how it might apply in mathematics and computer science.