Imagining numbers-HON 1000, CRN 85928 Fall 2008

Instructor: Florian Enescu

Classroom: Univ Ctr Room 430 **Class timings:** Tu 11:00 – 11:50 am

e–mail: fenescu@gsu.edu (usually the best way to contact me)

Office: 758 COE **Phone:** (404) 413 - 6442

Office hours: 758 COE M 4-5pm W 9-10am and by appointment

Recommended textbook(s):

Imagining numbers (particularly the square root of minus fifteen), by Barry Mazur, Picador, 2004 (paperback) (required)

Unknown quantity (a real and imaginary history of algebra) by John Derbyshire, Plume, 2007

Number: the language of science by Tobias Dantzig, Plume 2007

Course content:

We are working with numbers every day of our lives. We easily accept numbers like one, two, three and even negative ones, like minus two. We deal with fractions and more complicated numbers like pi, and we think of them as self defined entities. Do numbers really exists? If so, what precisely are they? How much are they fiction and how much reality? How did our attitude regarding numbers change over the centuries?

While the Greeks accepted natural numbers, it might be suprising to some to know that their sound mathematical foundation was laid out only in the eighteenth century. However, numbers like the square root of two were not accepted that easily since they cannot be written as the ratio of two whole numbers. A legend says that the Pythagorean who revealed this discovery to members outside the Pythagorean sect was drowned. Eventually humanity expanded their horizons to include all real numbers and later defined imaginary and complex numbers too. Can you imagine what the square root of minus fifteen is? These numbers were discovered in the sixteenth century. How did the people of that era dealt with them and why did they find them necessary? Are they all the numbers we need?

This course will discuss the concept of numbers: integers, rational, real and complex numbers and how they developed throughout the history of mankind. We will discuss the points of view of Greeks, Descartes, Viéte, the Italian School of mathematics and the French School of Mathematics. We will examine the mathematical problems that lead to the discovery of complex numbers. In the process we will answer the questions raised above as well as discuss what constitues a mathematical problem, how was algebra born, the role of analogies in mathematics and how problems about numbers shape mathematics today.

Homework: Two written essays will be assigned. Ten percent of the grade will be based upon the in-class discussions.

Grades:

This is a pass/fail class. To pass you need to score at least over 70 %.

Attendance: You are expected to attend regularly for the entire period of the class. That is, you are expected to arrive on time and stay for the duration of the class. After four or more absences a student can be dropped

from this class. In case of an absence, the student is responsible for knowing all the material covered.

Important dates: Last day to drop a class: August 22, on GoSolar. A student that does not attend the first two weeks can be dropped by the instructor.

Last day to withdraw from term length classes and possibly receive a W: October 1, 2008.

Disruptive behavior: Any disruptive behavior will be handled according to the University's policy on disruptive behavior (http://www.gsu.edu/~wwwsen/minutes/2002-2003/disrupt.html). This includes the possibility of withdrawing the student from the class.

Academic honesty: Academic honesty is expected from any student. Cheating will not be tolerated and handles according to the University's policy on academic honesty (http://www.gsu.edu/~wwwdos/codeofconduct_conpol.html) which includes academic as well as disciplinary penalties.

Changes: Any changes to the above syllabus will be announced in class. The course syllabus provides a general plan for the course; deviations might be necessary.