September, 1994

Information and Syllabus for Math 311:09

Instructor

S. Greenfield, Hill 542, 445-3074; messages for me can be left at 445-2390. Office hours are 4^{th} period on Tuesdays and Thursdays, or by appointment. I will also try to be available both before and after class. My e-mail address is `greenfie@math.rutgers.edu`; I read my e-mail regularly and this is a good way to communicate with me.

Text

R. G. Bartle & D. R. Sherbert, *Introduction to Real Analysis*, 2^{nd} edition, published by John Wiley (1992).

The Course

The prerequisite

This is advanced calculus. The true prerequisite for the course is “mathematical maturity” and some familiarity with calculus, which we seek to guarantee by having people take a bunch of math courses before this one. Thus we assume students entering 311 will have a firm grasp of the mechanics of calculus and should be ready to handle the reasoning underlying calculus. For most students, we strongly recommend that Math 300 (Introduction to Mathematical Reasoning) be taken before this course.

What's in the course

The content of this course is detailed, precise verification of the statements of one variable calculus. In particular, this means systematic investigation of complicated quantified statements involving inequalities. The course is mandatory for math majors and is meant to introduce students to the language of the core of classical mathematics as it has evolved over the last 200 years. After this course, students should be able to state precisely such results as the Intermediate Value Theorem (a continuous function with both positive and negative values defined on an interval must have at least one root somewhere in that interval). They should also be able to understand and explain the chain of deductive reasoning involved in going from basic assumptions about the structure of the real numbers to such statements.

New this year

This year the Department of Mathematics is experimenting with Math 311 and its algebraic sibling (Math 351) in an effort to help students learn more and learn better. Thus each of these courses will meet for 3 periods each week, and will count for 4 credits. The extra meeting time (the “workshop”) will be devoted primarily to students working in small groups on challenging problems reinforcing the lecture material. There will be no significant increase in the amount of subject matter covered in the course, but there will be an increase in the amount of in-class work and in the expectation for homework. Math faculty members believe that the additional class meeting time and the different use of this time will help students to understand the subject matter better, and will also substantially improve students' ability to communicate about mathematics.

What we expect from students

There will be two types of homework problems (both of which will be graded). One type will consist of problems assigned from the text; the other will stem from the workshops. Each workshop will be centered around several problems to be given out at the beginning of that workshop. Workshop time will be devoted to investigation and discussion of the problems by groups of students. Students will be required to hand in well-written solutions to one or two of these problems. This written work should represent students' own versions of the problem solutions and should not be copied from other students' work. The solutions to the workshop problems will be very carefully graded, both for clarity of exposition and for mathematical correctness.

We will have two in-class examinations which will be announced in advance and a three hour final examination. The cumulative grade for the course will depend on four components: textbook homework problems (15%), workshop problem solutions (15%), the two in-class exams (35%), and the final exam (35%).

When and where

Section 9 of Math 311 will meet 7^{th} period (6:10 to 7:30 PM) Tuesday and Thursday in HH A4 and 8^{th} period (7:40 to 9:00 PM) Tuesday in HH A6. By the way, every student in 311:09 *must* also be registered in 491:09.

Finally, how this is related to the text

The course will cover most of chapters 1 through 8 of the text. Precise section coverage and problem assignments will be given as we progress.

Frogs

Not required.