Course syllabus for MAT 512
Spring 2010

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Course Description

MAT 512 is the second in a two semester sequence on the foundations of analysis that begins with MAT 412. It revisits many of the topics that are first introduced in a basic calculus course – continuity, differentiability, limits, and the Riemann Integral – but the emphasis here is on supplying full mathematical rigor. It is "calculus done right." Students will also continue to hone skills in writing proofs, and in engaging in mathematical discourse, both written and oral.

MAT 512 is required for the B.S. degrees in mathematics. It is also a popular choice for a minor in mathematics, not only because it counts toward the minor but also because it is a prerequisite for many 500 level mathematics courses.

MAT 512 Introduction to Real Analysis 3 Y
Real number system, set theory and elementary topological properties of the real line, continuity and differentiability, sequences and series, uniform convergence, Riemann integration, and improper integrals. Prerequisite: MAT 412 or permission of instructor.

Text

Introduction to Real Analysis, 3rd Edition, Robert G. Bartle and Donald R. Sherbert, Wiley, 2000.

I plan to cover most of chapters 5-9.

Tests

There will be three in-class examinations:

Test 1: Wednesday, February 24.
Test 2: Wednesday, March 31.
Test 3: Monday, May 3.

Grading

The final grade will be based upon a course score made up of the following components: homework 25%, tests 25% each.

Academic Integrity

The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort.

Students with Disabilities

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Program Learning Outcomes (Mathematics Majors)

In all outcomes that call for mastery of some skill, such mastery is called for at the appropriate undergraduate level. Moreover, levels of mastery may well vary from student to student. (In bold are outcomes particularly relevant to MAT 512)

- **Understanding the nature and role of deductive reasoning in mathematics**
- **Ability to use and understand the usage of mathematical notation**
- **Ability to follow proofs and other mathematical discourse**
- **Ability to write simple proofs in the major proof formats (direct, indirect, inductive), and, more generally, to engage in mathematical discourse**
- Ability to select an appropriate mathematical model for a given real world problem
- Ability to apprehend and enunciate the limitations of conclusions drawn from mathematical models
- Ability to do hand calculations accurately and appropriately
- Ability to do calculations with the aid of appropriate hardware and/or software
- Having a basic knowledge of the contributions and significance of important historical figures in mathematics
- **Having a basic knowledge of the major modern theories of analysis, abstract algebra, geometry, and applied mathematics**
- Ability to effectively use mathematical word processing software
- Having a basic understanding of career options available to mathematics majors
- Ability to locate and use sources and tools that aid mathematical scholarship