Departmental syllabus for MAT 512
FALL 2012

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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 both the B.A. and 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.

Catalog Description

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. Prereq: MAT 412 or permission of instructor.

Text William R. Wade, <u>An Introduction to Analysis,</u> 4th edition, Pearson, Upper Saddle River, N.J., 2010. ISBN-13: 978-0-13-229638-0

I plan to cover most of chapters 5-9.

Tests There will be two in-class examinations and a cumulative final examination:

Test 1 Wednesday, October 3 (In class)
Test 2 Monday, November 5 (In class)
Final Exam Thursday, December 13, 12:45-2:35 (Location TBA)

Grading The final grade will be based upon a course score made up of the following components: homework and quizzes 25%, tests 50%, final 25%.

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.

Related link: http://disabilityservices.syr.edu/faculty-staff/syllabus-statement/

Religious observances policy. SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services -> Enrollment -> My Religious Observances) from the first day of class until the end of the second week of class.

Related link: http://supolicies.syr.edu/studs/religious_observance.htm

Academic Integrity Syracuse University sets high standards for academic integrity. Those standards are supported and enforced by students, including those who serve as academic integrity hearing panel members and hearing officers. The presumptive sanction for a first offense is course failure, accompanied by the transcript notation "Violation of the Academic Integrity Policy". The standard sanction for a first offense by graduate students is suspension or expulsion. Students should review the Office of Academic Integrity online resource "Twenty Questions and Answers About the Syracuse University Academic Integrity Policy" and confer with instructors about course-specific citation methods, permitted collaboration (if any), and rules for examinations. The Policy also governs the veracity of signatures on attendance sheets and other verification of participation in class activities. Additional guidance for students can be found in the Office of Academic Integrity resource: "What does academic integrity mean?"

Related links:

The Academic Integrity Policy: http://academicintegrity.syr.edu/academic-integrity-policy/

Twenty Questions and Answers about the Academic Integrity Policy: http://academicintegrity.syr.edu/faculty-resources/

What does academic integrity mean?: http://academicintegrity.syr.edu/what-does-academic-integrity-mean/

Learning outcomes, Help, and Tips

Learning outcomes

For all Math courses:

- Students will be able to use and understand the usage of mathematical notation

- Students will be able to select an appropriate mathematical model for a given real world problem

- Students will be able to do hand calculations accurately and appropriately

- Students will be able to do calculations with the aid of appropriate hardware and/or software

For all Math courses MAT 275, 295 and above:

- Students will understand the nature and role of deductive reasoning in mathematics

- Students will be able to follow proofs and other mathematical discourse

- Students will be able to write simple proofs in the major proof formats (direct, indirect, inductive), and, more generally, to engage in mathematical discourse

- Students will be able to apprehend and enunciate the limitations of conclusions drawn from mathematical models

For all Math majors:

- Students will be have a basic knowledge of the contributions and significance of important historical figures in mathematics

- Students will have a basic knowledge of the major modern theories of analysis, abstract algebra, geometry, and applied mathematics

- Students will be able to effectively use mathematical word processing software

- Students will have a basic understanding of career options available to mathematics majors

- Students will be able to locate and use sources and tools that aid mathematical scholarship

Getting help

Your instructor and recitation instructor will be holding regular office hours and will make appointments with students having class conflicts with their scheduled office hours. In addition, the Mathematics Department offers regular math clinics. These will be set up by the second week of the semester and a schedule of the clinics will be posted outside the math office and on the department's website.

How to succeed

Here are a few basic suggestions for how to succeed in this course.

1. It is absolutely essential that you understand how to solve the assigned homework problems and, more importantly, how and why the skills and techniques presented in the course are used in solving the assign problems. Quiz and exam questions will be similar to these problems.

2. Ask questions in lecture, recitation and/or at the clinic about anything that is not completely clear. Don't hesitate to bring questions to your instructors during office hours.

3. Every day, read and study the sections in the textbook covered in the lecture. Learning mathematics takes time! Read carefully and work through all the

examples in complete detail. It can be helpful to try to work through an example on your own before reading the solution.

4. Stay caught up. Mathematical concepts build on each other cumulatively and you need to stay on top of the material at every stage. If you are having difficulty, don't expect that the problem will take care of itself and disappear later. Contact your course instructor or your recitation instructor immediately and discuss the problem!

5. Form a study group. Many students benefit from a study group to work through challenging problems and to review for exams. You should attempt the problems ahead of time by yourself and then work through any difficulties with your study partners. Explaining your reasoning to another student can help to clarify your own understanding.

6. You should expect to work hard. Don't get discouraged if you find some of the material very difficult. Be persistent and patient! If you follow the above suggestions, your experience in this course will be a rewarding one.