

MAT 512, INTRODUCTION TO REAL ANALYSIS

Fall Semester 2015

Course Description: MAT 512 is the second in a two semester sequence on the foundations of analysis that begins with MAT 412. These two courses revisit 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. Students will also continue to learn writing proofs.

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.

Text: *Introduction to Real Analysis*, 4rd Edition, by W. Wade.

I plan to cover chapters 5-7, and perhaps a bit of 8, if time permits.

Professor: Yuan Yuan (Carn 313F).

Office Hour: Monday and Wednesday 2:10-3:30 or by appointment.

Class time and location: Monday and Wednesday 12:45-2:05 Carg 114

Grading: Grades for the course will be based on the total number of points accumulated on three in-class mid-term exams, the final examination, homework and quizzes. The mid-term exams will each count 15%, homework 25%, quizzes 5% and the final exam 25% toward your grade. There will be no make-ups exams. If you miss an exam for a valid reason, the corresponding portion of the final will be used to make up the missing score. The following grading scale will be applied to produce the final letter grade: 92.5-100 A, 90-92.5 A-, 87.5- 90 B+, 82.5-87.5 B, 80-82.5 B-, 77.5-80 C+, 72.5-77.5 C, 70-72.5 C-, 60-70 D, Below 60 F.

Exams: The exact dates for mid terms will be announced later in class. But the tentative schedule are:

Test 1 September 23, 2015

Test 2 October 21, 2015

Test 3 November 18, 2015

Final December 14, 2015

Homework: In order to learn this material it is absolutely vital that you do the problems. Time will be allotted at the beginning of most class periods to discussing the homework assignments. The exams will have a very large overlap with homework, although it is important to have also studied the material covered in class.

Class Attendance and Participation: You are expected to attend and participate in class. Missing class is the most common reason for poor performance in the course. If you must miss a class, you are responsible for obtaining notes for that class from a student who attended. It is also your responsibility to find out about any announcements made in class.

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.

Learning Goals and Expectations: Students are expected to master the basic notions of probability and to acquire the skills necessary for the application of these notions to the further study of probability and/or statistics.

Disabilities: Students who may need academic accommodations due to a disability are encouraged to discuss their needs with the instructor at the beginning of the semester. In order to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498 and have an updated accommodation letter for the instructor. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance. For more information contact the Office of Disability Services.

Office of Disability Services: Office of Disability Services, 804 University Avenue Room 309, Syracuse, New York 13244-2330 (315) 443-4498 TDD: (315) 443-1371 e-mail: odssched@syr.edu

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 a religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online registration is available through MySlice (Student Services -> Enrollment -> My Religious Observances) from the first day of class until the end of the second week of classes.

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 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 assigned 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.