MAT 324: Real Analysis, Fall 2017
Course Information

Teaching Staff

Instructor: Aleksey Zinger (azinger@math); *OHs:* Tu 2:30-4pm, Th 11:30am-1pm in Math 3-111
TA: Yuhan Sun (yuhansun@math); *OHs:* W 4-5pm in Math 5-125B, 5-7pm in MLC

Course Website

All homework assignments and various updates (including changes in OHs) will be posted on the course website,

`http://math.stonybrook.edu/~azinger/mat324`.

Please visit this website regularly.

About the Course

Pre-requisites: C (or higher) in MAT 203 or 307 or in AMS 261 *and* B (or higher) in MAT 320
You need to be comfortable with such notions as metric space, open/closed subset, compactness, connectedness, continuity, and uniform convergence of functions. These are Sections 13, 21, 22, 24, and 25 in the 2nd edition of *Elementary Analysis* by K. Ross (the standard MAT 320 textbook).

MAT 324 is the regular undergraduate MAT course with the smallest enrollment for a good reason. It continues MAT 320 and provides rigorous mathematical foundations useful for different areas of pure and applied mathematics, engineering, economics, and finance. Thus, while real analysis is an area of mathematics in itself, many of its important applications actually lie elsewhere and require further study to encounter.

Textbook

The textbook, which you need to acquire, is the 2nd edition of *Measure, Integral and Probability* by M. Capinski and E. Kopp, from the Springer Undergraduate Mathematics Series. An official erratum from the authors and an additional collection of corrections, which will be updated throughout the semester, are posted on the course website.

The textbook is written in a format intended for self-study. It focuses on examples and often treats special cases of statements before moving to full generality. It proves theorems, which generally require fairly elaborate arguments, shortly after they are stated, but initially leaves the proofs of propositions as (fairly straightforward) exercises to the reader. There are also actual exercises, which are generally fairly straightforward as well. Complete proofs of the propositions appear at the end of each chapter. Solutions, sketches of solutions, and outlines of solutions to the exercises appear at the end of the book.

Grading and Exams

Problem Sets 30%, *Midterm* (10/19, in class) 30%, *Final* (12/15, 11:15am-1:45pm) 40%

Bonus 1: if your score on the first-day quiz exceeds your weighted total for the semester, the latter will be multiplied by .9 and the former will count for 10% of the overall grade
Bonus 2: 1-10 pts (maybe more in extraordinary circumstances) will be added to the corresponding problem set score for pointing out typos/mistakes/errors in the textbook, any course notes, and lectures. Straightforward typos (including spelling, but not punctuation, errors in the textbook and any course notes) will be worth 1pt each; mistakes/errors of mathematical substance will be worth more, depending on their depth and subtlety. Anything already corrected in the errata for the textbook and/or in corrected versions of any course notes posted on the course website is not eligible for the bonus. Only the first person to bring up an issue will receive the bonus.

The problem sets will generally be due every Thursday, in class, with adjustments for the two short weeks and for the midterm week. **NO** late homework will be accepted under *any* circumstances; you will not receive a response to any email asking for an extension. However, your lowest problem set score will be dropped from the computation of the overall problem set score. If you will be out of town when a problem set is due, you can turn it in (give to the instructor or the grader or slip under the door of Math 3-111) any time before it is due (which you are welcome to do even if you won't be out of town).

There will be **no** make-up exams. If you miss the midterm for a legitimate and well-documented reason, your final exam score will be substituted for the midterm score. You must advise the instructor of your legitimate absence from the midterm and provide supporting documentation as soon as possible; each of these must be done as soon as possible even if it is not possible to do them at the same time. Depending on circumstances "as soon as possible" may be weeks before the midterm or immediately after. Having a conflict with another class is **not** a legitimate reason.

All scores will be available in *BlackBoard*, which will compute the overall problem set score (automatically dropping the lowest individual problem set score) and the weighted total for the semester. All issues regarding the score for an individual problem set (either how it was graded or whether its score appears correctly in *BlackBoard*) must be resolved with the TA within two weeks of the due date for the problem set and before the final exam (whichever comes first). All issues regarding the scores for the first-day quiz and the midterm must be resolved with the instructor within two weeks of the exams. The scores in *BlackBoard* will **not** be changed after these deadlines for *any* reason.

Homework Assignments

This is mostly definitely a proofs-oriented course, and studying (rather than just reading) the textbook is essential for doing reasonably in it. All reading assignments, which will be posted on the course webpage, should be interpreted as requiring you to prove the propositions and to do the exercises in the assigned sections before looking at the book's solutions. This should help you do reasonably on the exams, which will be based on the book's propositions and exercises and the additional written assignments. You will also need to be able to formulate the definitions and state the theorems appearing in the book and know how to use them (you do not need to memorize the exact wording in the book, but need to be able to convey the same meaning in your own words). *You will be responsible for the material contained in the reading assignments, whether or not it is directly covered in lecture.*

While you need to work out for yourself proofs of the propositions and solutions to the exercises in the textbook, only actual written assignments should be handed in for grading. These will usually be posted by Tuesday of each week and due in class on the Thursday of the following week, with some modifications due to the two short weeks and the midterm week. You are also welcome to hand in your solutions to the problem sets to either the instructor or the TA or slip them under the door of Math 3-111 any time before they are due. *Late problem sets will not be accepted under any circumstances.*

The clarity and completeness of your written work will influence its evaluation. This in no way means that you should turn two-line proofs into multi-page expositions. Try to be clear and concise, without omitting any details. Occasionally this may be achievable in a couple of lines; sometimes this may require half a page. In addition, please write legibly; if the TA is unable to read your solutions, with reasonable ease, you may receive no credit.

You are encouraged to discuss any aspect of this class, including the material covered in lectures, the readings, and the homework problems, with anyone, including other students in or outside of the class. You can also consult any source that may help you with the class in general and the homework problems in particular. You may (and in fact should) compare your homework solutions with each other. However, you should try to do all of the problems yourself first and should be able to do most of them without any help and you *must* write your own solutions to the problem sets. Given the small size of the class, there is a good chance that any overly similar solutions will be caught.

Finally, please do not fall behind; it will be much harder to catch up later. If you have any questions or want to discuss anything related to the class, please to *come to the office hours* of the instructor and/or the TA as soon as possible. Most MLC tutors (graduate students and faculty) should be able to help you as well (some tutors at MLC are MA/MS students who may not be familiar with MAT 324). The MLC schedule is available at

`http://www.math.stonybrook.edu/mlc/center-hours.html`.

Special Needs

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or

`http://studentaffairs.stonybrook.edu/dss/`.

They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their instructors and Disability Support Services. For procedures and information, please visit the following website:

`https://ehs.stonybrook.edu/programs/fire-safety`.

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another persons work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology and Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at

`http://www.stonybrook.edu/uaa/academicjudiciary/`.

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.