

Math 712, Fall 2017

Dr. Sarah Raynor

Textbook: An Introduction to Measure Theory, by Terence Tao, ISBN 978-0821869192.

Office: Manchester 343

Office Hours: Mondays and Thursdays 2-3pm and Tuesdays, Wednesdays, and Fridays 11am-12noon.

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Course Website: Please see the course Sakai website at sakai.wfu.edu for course materials. Please also create an account on Overleaf for homework assignments. The Overleaf account is free. Overleaf is an online collaborative tool for creating mathematical documents using the typesetting program LaTeX.

Course: This course will be an introduction to measure theory. We will begin by reviewing Jordan measure and the closely related Riemann integral. We will then introduce Lebesgue measure on Euclidean space and the corresponding Lebesgue integral. We will discuss important concepts of convergence and the main convergence theorems. Time permitting, we will discuss abstract measure spaces and differentiation further. I expect to cover most of Sections 1.1-1.4 of the text and as much of Sections 1.5-1.6 as time allows.

Student Learning Outcomes:

- Deep understanding of Riemann and Lebesgue integration on \mathbb{R} .
- Understanding of measure and measure spaces and several important examples.
- Facility with different modes of function convergence.
- Ability to construct rigorous, well-written analytic proofs.

Assignments: This course will emphasize the creation and proper writing of mathematical proofs. It will also challenge your intuition with examples of what may go wrong, and why our definitions and proofs are formulated as carefully as they are. For this reason, it is crucially important that you work to develop your intuition and proof-writing skills by doing regular homework. I strongly recommend that you do every problem in the sections that we cover. Each week, I will assign a few problems for you to write up and turn in. Homework problems will be due on Thursdays one-to-two weeks after assigned, and can be corrected and resubmitted once on the Thursday three-to-four weeks after originally assigned.

Evaluation: There are 4 components of your final grade:

1. There will be two midterm examinations which will be worth 20% of your grade each. Each will have both a take-home and in-class component. I have tentatively scheduled these exams for **September 28** and **November 2**. You must let me know if you will be unable to make these date by September 12. Otherwise, you can miss the exam only in the case of serious illness or emergency.
2. There will be a cumulative final examination which will have both in-class and take-home portions, and will be worth 35% of your grade. The final is scheduled for 2:00pm on **Wednesday, December 13**.
3. The written weekly homework is worth 15% of your grade.
4. Positive participation in class is worth 10% of your grade.

Make-up assignments will not be given, and late work will not be accepted. If you have to miss an assignment due to a legitimate excuse, that assignment will be excused and other assignments of the same type will be weighted more heavily to replace it.

The Honor Code: At Wake Forest, we expect you to behave as honorable citizens of the class, the university, and the world as a whole. When you complete an assignment with your name on it, you are representing that everything you are turning in is your own work. That means that you do not copy from other students, textbooks, or websites. You do not obtain the main ideas of a proof from someone else unless I have explicitly permitted you to do so.

The honor code is a token of our respect for you as members of the academic community. When one person cheats, it diminishes the experiences of everyone else in the program, both faculty members and students. Please, respect yourselves, each other, and me, and turn in only your own personal work. If at any time I become aware of cheating or plagiarism in this course, I will submit the information to the honor council. The format of any future assignments may also be affected, for the entire class.