

# Math 611, Fall 2017

Dr. Sarah Raynor

**Textbook:** Understanding Analysis, 2<sup>nd</sup> Edition, Stephen Abbott, ISBN: 978-149392711-1.

**Office:** Manchester 343

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**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](http://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 is a course in real analysis, the study of functions on the real line. Our course will discuss the nature of the real line, sequences and series, continuity and differentiability, and sequences and series of functions. In addition, we will extend these ideas to higher dimensions and, to some extent, to a mathematical generalization known as a metric space. If time permits we will also discuss integration. This course will comprise the first six to seven chapters of the text.

## Student Learning Outcomes:

- Understanding of the concept of convergence for both sequences and functions (and sequences of functions).
- Facility with the concepts of calculus at a high degree of mathematical rigor.
- Ability to work rigorously with  $\mathbb{R}$ ,  $\mathbb{R}^n$ , and basic metric spaces.
- Proficiency in the construction of mathematical proofs involving these concepts.

**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 Wednesdays one-to-two weeks after assigned, and can be corrected and resubmitted once on the Wednesday three-to-four weeks after originally assigned.

In addition to regular homework, students will have an extended project assignment. Each chapter of the text has at least one project section for students to work through in groups of 2 or 3; the section numbers are 1.6, 2.8, 3.5, 4.6, 5.4, 6.7, 8.2, or 8.6. Sign up for groups and topics will take place on Friday, September 8, so please look through the book before then to see what you find interesting. You may form your own groups or I can pair people up based on interest. A complete project will contain a nice write-up of the exercises in that section as well as a 15-20 minute in-class presentation of the material.

**Evaluation:** There are 5 components of your final grade.

1. There will be two midterm examinations which will be worth 15% of your grade each. Each will have both a take-home and in-class component. I have tentatively scheduled these exams for **September 29** and **November 3**. You must let me know if you will be unable to make this date by September 11. 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 30% of your grade. The final is scheduled for 9:00am on **Saturday, December 16**.
3. The written weekly homework is worth 15% of your grade.
4. The project assignment is worth 15% of your grade.
5. 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.

**Important Note for Graduate Students:** Students enrolled in Math 611 will be held to a higher standard than those in Math 311. Extra material will be covered on Thursdays at 1:00. As appropriate, this additional depth will be reflected in homework assignments, exams, and grades.