MATH 5143: Real Analysis
Syllabus

Instructor Contact Information

Instructor: Dr. Anne-Katrin Gallagher
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Office: MSCS 511
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Office Hours: M, W 1:30 -2:30 pm and 4-5pm in MSCS 511, or by appointment

Class & Resource Information

Class Meeting and Location: MWF 10:30am-11:20am in MSCS 509
Online Classroom: https://online.okstate.edu/

Prerequisites: Math 4153/Math 5053 – Advanced Calculus.

Required Materials:
Textbook: *Real Analysis* by G. B. Folland, 2nd edition.
Other resources: *Real Analysis* by H. L. Royden, *Real and Complex Analysis* by W. Rudin, *Real and Abstract Analysis* by E. Hewitt and K. Stromberg, and many more.

Course Information

Content: This course is an introduction to measure theory. It covers
- algebras and sigma algebras of sets, outer measures and the construction of measure by Caratheodory, Lebesgue-Stieltjes measures, Borel sets and measures, product measures, regularity properties of measures, measurable functions,
- construction of the integral with respect to a measure, convergence theorems, in particular: Lebesgue dominated convergence theorem, Fatou's lemma, monotone convergence theorem, Egorov's theorem, Lusin's theorem, and Fubini's theorem,
- signed measures and the Hahn decomposition, Radon-Nikodym Theorem, Lebesgue decomposition of a measure with respect to another measure, functions of bounded variation, absolutely continuous functions, Lebesgue-Stieltjes integrals.

In particular, Chapters 1-3 of the textbook will be covered.

Expectations: All students are expected to be active participants in class by asking and answering questions.
Plan to spend, on average, 15 hours each week outside of class on MATH 5143. This includes reading the text before class, working through your lecture notes after class, working on problems, discussing questions with others, and making use of office hours. Should you miss class, you are responsible for what you missed.
Take advantage of my office hours whenever you have questions on the material covered in class, homework etc. If you can't make it to the office hours, feel free to make an appointment with me and/or email your questions to me.

Missing Work Policy: Your instructor will make reasonable accommodations in the event that you miss an exam for a valid and documented reason, **assuming documentation is provided in advance** unless absolutely impossible. You will need to notify your instructor as soon as you know there is a conflict with one of the midterm exams or final exam; you will be ineligible for a make-up if you do not.

Grades:

Category	Percentage Grade
Exams 1&2	25% each
Final Exam	30%
Homework:	20%

Determination of Grades

$100\% \geq$ **A** $\geq 90\% >$ **B** $\geq 80\% >$ **C** $\geq 70\% >$ **D** $\geq 60\% >$ **F** ≥ 0

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Homework:

Each Monday homework will be assigned, the solutions are to be submitted at the beginning of class on Friday of the following week (i.e., 11 days after the assignment). Each problem should be submitted on a separate page. The top of each page should contain your name, the homework set number and the problem number. Please staple your solutions together after ordering them by problem number.

Only submit neatly written solutions (as you would whenever you present your work to somebody). It usually takes some time to solve these problems, and it usually takes several attempts to find a clear way of presenting a solution.

Please note that I might not always be able to grade all problems (but I will try!).

Suggestions:

Read the text before each lecture. Work through your lecture notes after each lecture. Think about what you learned that day. In particular, make a list of all new definitions, facts and theorems, how they connect and why they make sense and are true.

Exams:

There will be two 50 minute in-class exams, and a comprehensive Final Exam.

Exam 1: Friday, September 27, 10:30am-11:20am, in MSCS 509
Exam 2: Friday, November 8, 10:30am-11:20am, in MSCS 509
Final Exam: Wednesday, December 13, 10am-11:50am, in MSCS 509

Academic Integrity & Drops

Academic Integrity: Oklahoma State University is committed to the maintenance of the highest standards of integrity and ethical conduct. Please see the OSU Fall 2017 Syllabus Attachment for more information. You are encouraged to work and study together, however **all written and online work you submit must be your own**. Copying someone else's solutions or letting others copy your work is prohibited. Do not cheat. Violations may subject you to disciplinary action including the following: receiving a failing grade on an assignment, examination, or course, receiving a notation of a violation of academic integrity on your transcript (F!), or being suspended from the University.

Syllabus Attachment: Please access and read the OSU syllabus attachment on the web page: http://academicaffairs.okstate.edu/content/resources-faculty-staff. Follow the link under Syllabus Attachment for Spring 2017. This document contains important information, including instructions about disability accommodations. Please contact your instructor privately during the first week of the course if you need accommodations as the result of a disability. Any changes to this syllabus will be announced in class and posted on BrightSpace.