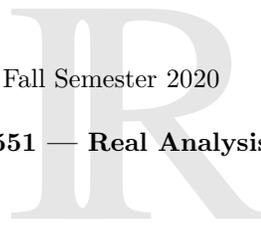


Fall Semester 2020

M 551 — Real Analysis



**Class:** MWF: 11:10 pm – 12:00 noon; MA 312; CRN: 74675

**Instructor:** Karel Stroethoff

**Contact Coordinates:** Office: MA 307; Phone: 243-4082; E-mail: karel.stroethoff@umontana.edu

**Moodle page:** <https://moodle.umt.edu/course/view.php?id=35600>

This site will contain all information on this sheet plus more. Homework assignments and other information pertinent to this course (such as office hours) will be posted at this web site, which will be updated frequently, so you should visit it regularly.

**Text:** Sheldon Axler, *Measure, Integration & Real Analysis*, Graduate Texts in Mathematics 282, Springer Verlag, 2020.

This textbook is published with a Creative Commons Attribution-NonCommercial license, and an electronic version of the book is available without cost at <http://measure.axler.net> (which also contains links to print versions of the text).

**Topics:** Topics covered will include: measure theory, abstract integration theory, theory of  $L^p$ -spaces, and applications to Fourier analysis and probability theory.

**Highlights:** The following are some of the most important results of the theory that we will cover in this course:

- Lebesgue measure and integral
- The Fundamental Theorems:
  - Bounded Convergence Theorem,
  - Fatou's Lemma,
  - Monotone Convergence Theorem, and
  - Dominated Convergence Theorem
- Product measures and the theorems of Fubini and Tonelli
- Hölder's and Minkowski's inequalities



<b>Important Dates:</b>	August 19:	Instruction begins
	September 7:	Labor Day Holiday, no class
	November 3:	Election Day, no class
	November 11:	Veteran's Day Holiday, no class
	November 18:	Last Day of Regular Classes
	November 20:	Final Exam (8:00am-10:00am)

**Grading:** Written homework assignments will be given throughout the semester. For each of the assignments students will have a variety of problems from which to choose, allowing for varying degrees of difficulty and different backgrounds and interests. Late homework problems will only be accepted within a week of the due date, and will be worth at most 80% of the points. The course grade will be based on Homework (75%) and a Final Exam (25%).



Henri Lebesgue  
(1875–1941)

Lebesgue's informal description of his method of integration:

“I have to pay a certain sum, which I have collected in my pocket. I take the bills and coins out of my pocket and give them to the creditor in the order I find them until I have reached the total sum. This is the Riemann integral. But I can proceed differently. After I have taken all the money out of my pocket I order the bills and coins according to identical values and then I pay the several heaps one after the other to the creditor. This is my integral.”