

## MAT 570 Real Analysis Course Announcement

**Professor:** John Quigg

**Semester:** Fall 2020

**Classes:** Tuesday and Thursday 10:30–11:45 in WGHL L1-08

**Description:** This is the first semester of the real analysis course for graduate (and superior undergraduate) students in mathematics — see the syllabus posted elsewhere as a pdf file.

We will begin with a quick overview of metric-space analysis (generalizing from  $\mathbb{R}$ ). For this material I will post my own notes, based in part upon Chapters 2–4 and 7 in Rudin’s “Principles of Mathematical Analysis”.

Then we will turn to Folland’s book (see below) for real analysis “proper”. Topics include: measure theory, Lebesgue integration, and function spaces. This is fundamental material that has applications virtually everywhere in pure and applied mathematics.

Note: the sequence MAT 570–571 prepares one for the Qualifying Exam in Real Analysis.

**Prerequisites:** The same as for admission to the Math PhD program, namely advanced calculus — at some institutions this course is called “introduction to real analysis” — (equivalent to MAT 371 at ASU) and linear algebra (equivalent to MAT 342). The specific advanced calculus requirement comprises a rigorous development of calculus on the real line, with complete proofs, and where students become proficient at constructing proofs of correct mathematical statements and counterexamples to incorrect ones, and how to tell the difference. The linear algebra requirement constitutes abstract vector spaces over the real and complex numbers, linear transformations, and inner products.

In any case, I encourage anyone interested in the course to contact me at quigg@asu.edu or WCLR 728.

**Textbook:** G.B. Folland, “Real Analysis”, 2nd ed., Wiley, 1999.

**Grading:** The grade will be based on weekly homework, a midterm exam, and a final exam.