Math 6211 Real Analysis I

AU 2018
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Syllabus

1 Topics covered

1.1 Introduction to Fourier Analysis

Fourier series, the Dirichlet and Fejer kernels, Fejer's theorem, pointwise convergence of Fourier series.

1.2 Measures

σ-algebras, measures, outer measures, Borel measures on the real line.

1.3 Integration

Measurable functions; integration of nonnegative functions; integration of complex functions; modes of convergence; product measures; the n-dimensional Lebesgue integral; integration in polar coordinates.

1.4 Signed Measures and Differentiation

Signed measures; the Lebesgue-Radon-Nikodym theorem; complex measures; differentiation on Euclidean space; functions of bounded variation.

1.5 Point Set Topology

Topological spaces; continuous maps; nets; compact spaces; locally compact Hausdorff spaces; compactness theorems; the Stone-Weierstrass theorem; embeddings in cubes.

1.6 Elements of Functional Analysis

Normed vector spaces; linear functionals; the Baire Category theorem and its consequences; topological vector spaces; Hilbert Spaces.

There will be two midterms and a final exam. Homework will be handed out each Monday and you will have one week to turn the solutions in. The distribution of points, out of 500, will be:

$$\text{HW}: 100; \text{ Midterm 1}: 100; \text{ Midterm 2}: 100; \text{Final Exam}: 200$$

Academic Misconduct Statement:

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-48.7). For additional information, see the Code of Student Conduct at http://studentlife.osu.edu/csc/.

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The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.