MA 222 Jan 3:1

Measure and integration

Instructor

Manjunath Krishnapur
Email: manju@iisc.ac.in

Teaching Assistant

Email:

Department: Mathematics

Course Time: 2:00-3:30

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

This course is an introduction to the integral and differential calculus of measures. It is required to learn functional analysis and provides the foundation for probability theory. Good understanding of basic real analysis and topology is required. Usually fourth or third year undergraduates and first year integrated PhD students in mathematics take this course. Graduate students in engineering departments who wish to learn probability theory in depth may also want to credit this course.

Prerequisites

Real analysis, Topology

Syllabus

Construction of Lebesgue measure, Measurable functions, Lebesgue integration, Abstract measure and abstract integration, Monotone convergence theorem, Dominated convergence theorem, Fatouâ€™s lemma, Comparison of Riemann integration and Lebesgue integration, Product sigma algebras, Product measures, Sections of measurable functions, Fubiniâ€™s theorem, Signed measures and Randon-Nikodym theorem,

Lp-spaces, Characterization of continuous linear functionals on Lp - spaces, Change of variables, Complex measures, Riesz representation theorem.

Course outcomes

Lebesgue integral. Lebesgue differentiation.

Grading policy

20% for assignments, 30% for midterms, 50% for final exam

Assignments

Resources

Stein, Elias M.; Shakarchi, Rami (2005). Real Analysis: Measure Theory, Integration, and Hilbert Spaces. Princeton University Press. ISBN 0691113866.