

MA 442 - Real Variables

Instructor: Nikolay S. Strigul
E-mails: nstrigul@stevens.edu
Office Hours: by appointment
Lectures: TR, 12:00-01:15 pm, Babbio Center 221

Grading:

- * Quizzes: 20 %
- * Homework assignments: 20 %
- * Midterm: 25 %
- * Final: 35 %

General comments:

MA442 is an advanced undergraduate course in real analysis. The major objective of this course is to cover Lebesgue measure and integral. Our major compromise in order to deliver this theory to undergraduates is to construct Lebesgue's theory on the real line rather than in an abstract space (we also will introduce it on the real plane). For the same reason, necessary background topics from algebra and topology will be introduced in the context of metric and normed vector spaces. L_p spaces will be also considered in this course. The theory will be generalized if the time permits.

Syllabus:

1. Elements of algebra (Groups, semi-rings, rings, fields, algebras)
2. Real numbers.
3. Elements of set theory.
4. Metric spaces.
5. Normed vector spaces.
6. Topology.
7. Continuous functions.
8. Homeomorphisms.
9. Connectedness.
10. Completeness.
11. Compactness.
12. Sequences of functions.
13. Lebesgue measure.
14. Measurable functions.
15. The Lebesgue integral.
16. L_p spaces
17. Lebesgue's differentiation theorem.