Department: Mathematics and Computer Sciences
Division: Pure Mathematics
Level and Major: Graduate

Course Title: Real Analysis 1
Number of Credits: 3
Prerequisite:
Lecturer:

Course Description: Measure, Outer Measure, Measurable functions, Lebegues Integral, Convergence Theorems, Fubinis Theorem, Banach Spaces, Hilbert Spaces, L^p Spaces, Radon-Nikodym Theorem

Course Goals and Objectives:

Course Topics:

- The Concept of Measurability - Sigma-Algebra - Measurable Functions
- Positive Measure and Measure Space - Lebesgue Integral
- Lebesgues Monotone Convergence and Lebesgues Dominated Convergence Theorems
- The Riesz Representation Theorem
- Continuity properties of measurable functions
- Convex functions and inequalities - Lp-Spaces
- Hilbert Spaces – Orthonormality – Vectors with smallest norm
- Gram-Schmidt orthogonalization process - Galerkin and Collocation numerical methods
- Banach Space – The norm of the Linear Transformations
- The Open Mapping Theorem - The Hahn-Banach Theorem
- Poisson integral - Complex Measures
- Total variation - Absolute continuity - Outer measure
- Derivatives of measures arisen from the Radon-Nikodym theorem
- Measurability on cartesian products - Product measures
- The Fubini theorem

Reading Resources:

Evaluation: