

Syllabus

Instructor: Prof. Abdelkader Boucherif

Course No.: Math.611

Course Title: Hilbert space methods in applied mathematics

Textbook: I. Stakgold, Green's functions and boundary value problems,
John Wiley & Sons, New York, 1979

Objectives: This course is designed to expose the students to methods applicable to problems arising in the applied sciences.

The method of Green's functions is introduced through intuitive ideas and simple examples,

and then applied to the systematic study of two-point boundary value problems for second and higher order differential equations.

Sturm Liouville theory, eigenfunctions expansion are introduced to complement the Green's function approach.

The theory of distributions will be presented in an elementary way.

Metric and Hilbert spaces shall be discussed in order to introduce the basic ideas of operator theory

with application to Volterra and Fredholm integral equations.

Week	Section #	Topic
1-2	Chapter 1	Green's functions: examples, properties
3-5	Chapter 3	One dimensional boundary value problems
6-8	Chapter 2	Theory of distributions and related topics
9-12	Chapter 4	Metric and Hilbert Spaces
13-14	Chapter 5	Operator Theory
15	Chapter 6	Integral Equations

Grading Policy: One Midterm Exam: **35 %**; Final Exam: **45 %**; Assignments: **20 %**.