

King Fahd University of Petroleum and Minerals
 Department of Mathematical Sciences
Syllabus Semester II, 2012-2013

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Course #: MATH 513
 Title: Mathematical Methods for Engineers

Textbook: Advanced Engineering Mathematics with Matlab, by D.G. Duffy, 3rd edition.

Other useful references:

Advanced Engineering Mathematics (4th ed.) by Zill & Wright
 Beginning Partial Differential Equations (3rd ed.) by P.V. O'Neil

Objectives: This course aims to introduce and develop important mathematical concepts of engineering mathematical methods and their applications, such as Fourier and Laplace Transforms, Sturm-Liouville problems, PDE's and Linear Algebra.

Outcomes: By the end of the course the student should be confident with the following:

- performing Fourier and Laplace Transforms of some common functions
- solving linear Laplace, wave and heat diffusion equations
- solving Sturm-Liouville problems
- using separation of variables, Fourier and Laplace Transform methods to solve PDE's
- special functions (Bessel, Legendre, Error functions)
- matrix algebra and computations
- solving and computing solutions to systems of linear equations
- using Matlab to solve computational problems

Week	Chapter	Material	Assignments
1	--	Orthogonal Functions	TBA
2—4	9	The Sturm-Liouville Problem	TBA
5—6	10	The Wave Equation	TBA
6—7	11	The Heat Equation	TBA
7—8	12	The Laplace Equation	TBA
9	4	Fourier Series	TBA
10—11	5	Fourier Transform	TBA
12—13	6	Laplace Transform	TBA
14	14	Linear Algebra	TBA

Grading (approximately): Three exams 30%, 20%, 20%. Project: 14%, Assignments: 16%