

Math 513 Syllabus (162)

Dr. Khaled Furati

Course Title: Mathematical Methods for Engineers

Textbook: Advanced Engineering Mathematics with Matlab, Dean G. Duffy, 3rd Ed, 2010.

Course Description: Laplace transforms including the convolution theorem, error and gamma functions. The method of Frobenius for series solutions to differential equations. Fourier series, Fourier-Bessel series and boundary value problems, Sturm-Liouville theory. Partial differential equations: separation of variable and Laplace transform and Fourier integrals methods. The heat equation. Laplace equation, and wave equation. Eigenvalue problems for matrices, diagonalization.

Objetives: This course is designed to introduce basic methods in Linear Algebra and Partial Differential Equations to students of engineering and science.

Learning Outcomes:

- 1- Obtain Fourier series representations of commonly used functions,
- 2- Solve Sturm Liouvilles Problems,
- 3- Know basic properties of Laplace and Fourier Transforms and be able to find transforms of commonly used functions,
- 4- Know basic linear partial differential equations (PDEs),
- 5- Solve these PDEs using Fourier Series, Laplace, and Fourier Transforms
- 6- Understand and apply basic linear algebra.

Wk	Date	Chapter	Topic
1	Feb 05 – 09	4	Fourier Series
2	Feb 12 – 16		
3	Feb 19 – 23	5	The Fourier Transform
4	Feb 26 – Mar 02		
5	Mar 05 – 09	6	The Laplace Transform
6	Mar 12 – 16		
7	Mar 19 – 23	9	The Sturm-Liouville Problem
8	Mar 26 – 30		
<i>Apr 2 - 6, Midterm Break</i>			
9	Apr 09 – 13	10	The Wave Equation
10	Apr 16 – 20		
11	Apr 23 – 27	11	The Heat Equation
12	Apr 30 – May 04	12	The Laplace Equation
13	May 07 – 11	15	Linear Algebra
14	May 14 – 18		
15	May 21 – 25	---	Review