BA223- Mathematics (3)

Hour: Lecture: 2 Hrs. Tutorial: 2 Hrs. Credit: 3.

Coordinator: Nehad Nashaat

Text Book:
- Erwin Kreyszig, *Advanced Engineering Mathematics* , John Wiley, 9th edition , 2006 .

Specific course information:
a. Solving first order differential equations: Separable of variables, Homogeneous equation, Exact equation, Linear equation and Bernoulli's equation. Solving second order homogeneous and non-homogeneous differential equations with constant and variable coefficients. Undetermined coefficients and variation of parameters methods. Laplace transformations, basic properties, first shifting theorem, unit step function, second shifting theorem, transform of derivatives and integrals, and inverse Laplace transforms. Solving differential equations by using Laplace transform. Fourier series: Fourier series for even, odd, and harmonic functions.
b. Prerequisite: BA124
c. Designation: Required

Specific goals for the course:
- An ability to apply knowledge of mathematics, science, and engineering.

Course instruction outcomes:
- The students will be able to perform and solve differential equations, Laplace transform and Fourier analysis, that is of fundamental importance in modern engineering and science.

Student outcomes:
A, E

Topics Covered:
Solving first order differential equations: Separable of variables and Homogeneous equation - Solving first order differential equations: Exact and Linear equations - Solving first order differential equations: Bernoulli's equation and revision on first order differential equations - Solving second order homogeneous differential equations with constant coefficients, method of undetermined coefficients - Solving second order non-homogeneous differential equations with constant coefficients, method of variation of parameters - Continue method of variation of parameters, solving second order differential equations with variable coefficients (Euler's equation), Laplace transform: Basic definition, First shifting theorem, Laplace transform:

Transform differentiation and integration, Unit step function, second shifting theorem, and convolution theorem - Inverse Laplace transforms - Solving differential equations by using Laplace transform - Fourier series: Fourier series for functions of period 2P - Fourier series for even and odd functions - Fourier series for harmonic functions.

Course / credit hours	Math & Basic Sciences	Engineering Topics	General Education
Math 3 (BA223)/3	3		