

BA 223 – Mathematics (3)

COURSE INFORMATION

Course Title: Mathematics (3).

Code: BA223.

Contact Hours (hours/week): Lecture – 2 Hrs. Tutorial –2 Hrs. Credit –3.

Prerequisite: BA124

Course Coordinator: Dr. Nehad Nashaat

GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7th Week): 30%

Midterm # 2/Assignments – (12th Week): 20%

Final Exam: 40%

COURSE DESCRIPTION

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.

TEXT BOOKS

Erwin Kreyszig, 'Advanced Engineering Mathematics', John Wiley, 9th edition, 2006.

COURSE AIM

To study various methods of solving differential equations, which arise as mathematical modeling in many topics of engineering.

COURSE OBJECTIVES

The objectives of this course are: studying differential equations, Laplace transform and Fourier analysis, that is of fundamental importance in modern engineering and science.

COURSE OUTLINE

Week Number 1: Solving first order differential equations: Separable of variables and Homogeneous equation.

Week Number 2: Solving first order differential equations: Exact and Linear equations.

Week Number 3: Solving first order differential equations: Bernoulli's equation and revision on first order differential equations.

Week Number 4: Solving second order homogeneous differential equations with constant coefficients. Method of undetermined coefficients.

Week Number 5: Solving second order non-homogeneous differential equations with constant coefficients. Method of variation of parameters.

Week Number 6: Continue method of variation of parameters. Solving second order differential equations with variable coefficients (Euler's equation).

Week Number 7: Laplace transform: Basic definition, First shifting theorem.

Week Number 8: Laplace transform: Transform differentiation and integration.

Week Number 9: Unit step function, second shifting theorem, and convolution theorem.

Week Number 10: Inverse Laplace transforms. s

Week Number 11: Solving differential equations by using Laplace transform.

Week Number 12: Fourier series: Fourier series for functions of period $2P$.

Week Number 13: Fourier series for even and odd functions.

Week Number 14: Fourier series for harmonic functions.

Week Number 15: Revision

Week Number 16: Final Exam