CE/BOS/CE 501/0709

K L UNIVERSITY

APPLIED MATHEMATICS (CE C501)

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SYLLABUS

UNIT I One Dimensional Wave And Heat Equations

Laplace transform methods for one-dimensional wave equation – Displacements in a long string – longitudinal vibration of an elastic bar – Fourier transform methods for one-dimensional heat conduction problems in infinite and semi-infinite rods.

UNIT –II Elliptic Equation

Laplace equation – Properties of harmonic functions – Solution of Laplace's equation by means of Fourier transforms in a half plane, in an infinite strip and in a semi-infinite strip – Solution of Poisson equation by Fourier transform method.

UNIT III Calculus of Variations

Concept of variation and its properties – Euler's equation – Functional dependant on first and higher order derivatives – Functionals dependant on functions of several independent variables – Variational problems with moving boundaries –Direct methods – Ritz and Kantorovich methods.

UNIT IV Eigen Value Problems

Methods of solutions: Faddeev – Leverrier Method, Power Method with deflation – Approximate Methods: Rayleigh – Ritz Method

UNIT V Numerical Integration

Gaussian Quadrature – One and Two Dimensions – Gauss Hermite Quadrature – Monte Carlo Method – Multiple Integration by using mapping function

REFERENCES:

1. Introduction to Partial Differential Equations by K. Sankara Rao, Prentice Hall of India Pvt. Ltd., New Delhi, 1997.
2. Numerical Methods in Science and Engineering A Practical Approach by S. Rajasekaran, A. H. Wheeler and Company Private Limited, 1986.
3. Calculus of Variations with Applications by A.S. Gupta, Prentice Hall of India Pvt. Ltd., New Delhi, 1997.
4. Integral Transforms for Engineers by L.C. Andrews and B. K. Shivamoggi, Prentice Hall of India Pvt. Ltd., New Delhi, 2003.