

FMCC703ADVANCED DIFFERENTIAL EDUCATION(3-1-0)

Module-I : (14 Hours)

Application of first order differential equation in Growth, decay, Chemical Reactions, Elementary Mechanics, One dimensional heat flow, Orthogonal trajectories, Biological Sciences (The oxygen debt), Mixing problems, Business and Economics.

Application of Linear differential equation in Escape velocity problem, Undamped simple harmonic vibrations, Damped vibrations. Electric circuits problems.

Hermite equations and Hermite Polynomials, Hypergeometric equations, Hypergeometric functions, Elementary properties hypergeometric functions.

Module-II : (14 Hours)

System of Linear Differential Equations : Basic Theory of Linear Systems, Trial Solution Method for Linear System with Constant co-efficients, Operator method for linear system with Constant co-efficients, Matrix method for linear system with Constant co-efficients. Non-Homogeneous Linear Systems.

The Laplace Equation: Boundary value problem for Laplace's Equations, Fundamental Solution of Laplace's Equation, Integral Representation of Harmonic Functions, Mean Value Formula for Harmonic Functions, Green's Functions for Laplace's Equation

Module-III : (12 Hours)

The Wave equation: Derivation of One Dimensional Wave Equation, Solution of the wave Equation (Method of separation of variables), D'Alembert's solutions of the wave Equation, Derivations of Two Dimensional Wave equation, Solutions of Two Dimensional Wave equation.

The Heat equation: The One Dimensional Heat Equation, Solution of One Dimensional Heat Equation Derivation of two Dimensional Heat Equation, Solution of Two Dimensional Heat Equation, Laplace Equations in Polar Coordinates.

Books Recommended:

(1) A course on Ordinary and Partial Differential Equations by J. Sinha Roy and S. Padhy, Kalyani Publishers.

Chapters: 2(2.8), 4(4.8), 7(7.3.2,7.4.3,7.4.4), 8, 15(15.1-15.4), 16(16.1-16.4)

(2) Higher Engineering Mathematics by B V Ramana

Chapter 19 (19.1-19.8)

(3) Ordinary and Partial Differential Equations by M. D. Raisinghania.