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2003-2004 AB

ANDHRA UNIVERSITY
DEPARTMENT OF MATHEMATICS
M.Sc MATHEMATICS
IV SEMESTER
M 402 PARTIAL DIFFERENTIAL EQUATIONS

Syllabus

UNIT I: First order partial differential equations in two independent variables and the Cauchy problem - semilinear equations - Quasilinear equations - The Characteristic Cauchy Problem - General solution - Monge strip and Charpit equations - Solution of a Cauchy problem - Solution of a Characteristic Cauchy Problem - Determination of a complete integral - New solutions from a complete integral - solution of a Cauchy problem.

Sections 1.1, 2.1-2.4, 3.1-3.3, 4.1-4.3 in Chapter 1 of the Text Book.

UNIT II: Linear equation in two independent variables - Linear equation in more than two independent variables - The Cauchy Problem - Propagation of discontinuities - Boundary value problems and Cauchy Problem - singularity functions and the fundamenatal solutions: Green's function - Poisson's theorem - the mean value and the maximum and minimum properties.

Sections 1.1-1.4, 2.1-2.4 in Chapter 2 of the Text Book.

UNIT III: Existence and uniqueness theorems for the initial value problem in an infinite domain - Initial - boundary value problems for a semi infinite domain - Initial boundary value problems for heat conduction in a finite bar - the one dimensional wave equation.

Sections 3.1-3.3, 4.1 in Chapter 2 of the Text Book.

UNIT IV: The three dimensional Wave equation - Method of Spherical Means - the two dimensional wave equation: Hadamard's method of Descent - propagation of confined initial disturbances - Continuable initial conditions - Duhamel's principle, solution of the inhomogeneous wave equation, Retarded potential - Boundary value problem for the one dimensional wave equation.

Sections 4.2-4.8 in Chapter 2 of the Text Book.

Text book: Phoolan Prasad and Renuka Ravindran, Partial Differential Equations, New age International Publishers, New Delhi, 1985.