

Math 568 Syllabus (081)

Dr. K. M. Furati

Course Title: Advance Partial Differential Equations I

Textbook: Partial Differential Equations: Methods & Applications, R. McOwen, 2nd Ed.

Course Description: First order linear and nonlinear equations. Classification of Second order equations. The wave equation, heat equation and Laplace's equation. Green's functions, conformal mapping. Separation of variables, Sturm-Liouville theory. Maximum principles and regularity theorems.

Ch.	Title	# Wks	Sec	Title
Intr.	Definitions and Notation	1	–
1	First-Order Equation	3	1.1	Cauchy Problem for Quasilinear Equations
			1.2	Weak Solutions for Quasilinear Equations
			1.3	General Nonlinear Equations
2	Principles for Higher-Order Equation	2	2.1	The Cauchy Problem
			2.2	Second-Order Equations in Two Variables
			2.3	Linear Equations and Generalized Solutions
3	The Wave Equation	3	3.1	The One-Dimensional Wave Equation
			3.2	Higher Dimensions
			3.3	Energy Method
			3.4	Lower Order Terms
4	The Laplace Equation	3	4.1	Introduction
			4.2	Potential Theory and Green's Function
			4.4	Eigenvalues of the Laplacian
5	The Heat Equation	2	5.1	The Heat Equation in a Bounded Domain
			5.2	Initial-Value Problem
			5.3	Regularity and Similarity
–	Extras	1	–

Grading:		%
	HW	30
	Midterm	30
	Final	40