



MAT 631 – Partial Differential Equations

Course Code & Number	Course Name	Credit Hours	Lec.	Lab.	Tut.	Prerequisites
MAT 631	Partial Differential Equations	4	3	0	1	

Syllabus:

Generalities on PDEs: Classification of PDEs, Classical PDEs of mathematical physics, Definition of Initial-Boundary-Value Problems.

Analytic Solution of PDEs: Partial differential equation problems on finite domains: Separation of Variables and Fourier series; Partial differential equation problems on infinite domains: The Fourier Integral. The Fourier transforms. The Laplace transforms.

Elements of Distributions and Laplace operator: test functions and distributions, differentiation, multiplication by smooth functions; fundamental solution, weak solutions, Maximum principle; Harmonic functions. Green's Functions. Laplace's equation in polar and spherical coordinates.

References:

1. L. C. Evans; *Partial Differential Equations*; 2nd Edition, American Mathematical Society, 2010. **(Main Reference)**
2. R. Haberman; *Applied Partial Differential Equations with Fourier series and Boundary Value Problems*; 5th Edition, Pearson Higher Education, 2013.
3. R. McOwen; *Partial Differential Equations: Methods and Applications*; 2nd Edition, Pearson, 2002.

