Course Title	Course Code	Credit Hours
Multivariable Calculus and PDEs	MATH-203	3 – 0

Textbook:

- Dennis G. Zill and Michael Cullen, Differential Equations (3rd Edition)

Reference Books:

- E. Kreyszig, Advanced Engineering Mathematics, 9th ed.
- Glyn James, Modern Engineering Mathematics.

Course Objective:

Develop proficiency in solving and applying multivariable calculus and partial differential equations to engineering problems.

Course Outline:

• Basic Concepts. Matrix Addition. Scalar Multiplication Matrix Multiplication • Linear Systems of Equations. Gauss Elimination.
• Solution of Linear Systems: Existence, Uniqueness, General Form • Inverse of a Matrix. Gauss-Jordan Elimination.
• Vector Spaces, Sub Spaces and Linear Transformations
• Linear dependence, linear independence, spanning set, basis • Eigenvalues and Eigenvectors
• Separable Variables.
• Homogeneous Equations.
• Exact Equations and Integrating Factors. • Linear Equations.
• Equations of Bernoulli, Ricatti and Clairaut.
• Applications of Linear and Non-Linear First Order ODEs.
• Preliminary Theory.
• Initial and Boundary Value Problems.
• Linear Dependence and Linear Independence.
• Homogeneous Linear Equations with constant coefficients.
• Undetermined Coefficients. • Variation of Parameters.
• Cauchy-Euler Equation.
• Laplace Transform and Inverse Transform. • Unit step function, Dirac delta function
• Solution of 1st and higher order initial value problem using Laplace Transform.

Description	Percentage Weightage (%)
Assignments	05-10%
Quizzes	10-15%
Mid Semester Exams	30-40%
End Semester **ASSESSMENTS** Exam	40-50%