



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Department of Mathematics (GE for UG Students)

| SUBJECT CODE | Category | SUBJECT NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|--------------|----------|--------------------------|------------------------------|-----|-----|-----------|-----|----|---|---|---------|
| | | | THEORY | | | PRACTICAL | | Th | T | P | CREDITS |
| | | | END SEM | MST | Q/A | END SEM | Q/A | | | | |
| MAUGGE07 | GE | Numerical Methods | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

Course Objective

To introduce the Students with the Numerical Methods for PDE and basics of the Finite Difference methods.

Course Outcomes

After the successful completion of this course students will be able to:

1. classify the PDE's
2. apply the numerical techniques to find the solution of partial differential equations
3. apply the basics of the finite difference methods
4. analyse and solve the wave and heat equations
5. to create solutions of one dimensional PDE by FEM.

Course Content:

UNIT – I

Classification of Partial Differential Equations, Finite Difference approximations to partial derivatives.

UNIT – II

Elliptic equations, Numerical solution of Laplace's Equation, Solution of Poisson Equation.

UNIT – III

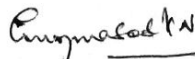
Parabolic Equations, Numerical solution of Heat Equation.

UNIT – IV

Hyperbolic Equations, Numerical solution of Wave Equation.


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UNIT – V


Concepts of Finite Element Method. Numerical solution of one dimensional PDE.

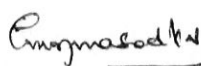
Texts:


1. Higher Engineering Mathematics, B. S. Grewal.

References:

1. A First Course in the Numerical Analysis of Differential Equations. Cambridge Texts in Applied Mathematics, Series Number 44, Arieh Iserles.
2. Numerical Solutions of Partial Differential Equations" by G D Smith
3. Finite Difference Methods for Ordinary and Partial Differential Equations by Randall J. LeVeque.


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