M-204

Course contents

1. Definition of a Differential equation, Classification of Differential equations, type of solutions.
2. Initial value problems. Existence and uniqueness theorem, separable equations (Separable variables).

3. Equations with homogeneous coefficients, Exact Equations

4. Integrating factors, general form of a linear equation and Equations with linear coefficients

5. Bernoulli equation.

6. Applications, Linear Models: Orthogonal trajectories, Growth and decay, Newton's Law of Cooling.

7. Higher order Differential equations. Linear Differential equations: Existence and Uniqueness Theorem, Linearly (independent solutions, dependent solutions), Wronskian, Method of Reduction of order.

8. Homogeneous linear Differential equations with constant coefficients. Undetermined coefficient method.

9. Cauchy-Euler Equation, Variation of parameters.

10. Solving systems of Linear Equations by Elimination Method.

11. Series solutions of Linear Equations.

12. Orthogonal Functions and Fourier series.

13. Fourier cosine and sine series, Complex Fourier series.

14. Fourier Integral. Complex form of Fourier integra