

Curriculum Plan: B.Sc. (H) Mathematics, I Year (Semester II)
Ordinary Differential Equations

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Marks Distribution	Theory: 90 Marks Internal Assessment: 30 Marks Practical: 40 Marks
Classes Assigned	Lectures: 3 per week Practicals: 2 per week

Week-wise Teaching Plan

Week	Topics
Week 1 (2–3 Jan)	Concept of implicit, general and singular solutions for the first order ordinary differential equation
Week 2 (5–10 Jan)	Bernoulli's equation
Week 3 (12–17 Jan)	Exact equations, Integrating factors
Week 4 (19–24 Jan)	Initial value problems, Reducible second order differential equations
Week 5 (26–31 Jan)	Applications of first order differential equations to Newton's law of cooling, exponential growth and decay problems
Week 6 (2–7 Feb)	General solution of homogenous equation of second order
Week 7 (9–14 Feb)	Principle of superposition for a homogenous equation, Wronskian and its properties
Week 8 (16–21 Feb)	Linear homogeneous and nonhomogeneous equations of higher order with constant coefficients
Week 9 (23–28 Feb)	Method of variation of parameters, Method of undetermined coefficients
Week 10 (9–14 Mar)	Two-point boundary value problems,

	Cauchy- Euler's equation
Week 11 (16–21 Mar)	System of linear differential equations
Week 12 (23–28 Mar)	Application of second order differential equation: Simple pendulum problem
Week 13 (30–4 Apr)	Density-dependent growth model, Interacting population models
Week 14 (6–11 Apr)	Epidemic model of influenza and its analysis
Week 15 (13–18 Apr)	Predator prey model and its analysis
Week 16 (20-25 Apr)	Equilibrium points, Interpretation of phase plane
Week 17 (27-30 Apr)	Revision
1-8 March: Semester Break	

References

1. Barnes, Belinda & Fulford, Glenn R. (2015). **Mathematical Modeling with Case Studies, Using Maple and MATLAB (3rd ed.)**. CRC Press. Taylor & Francis Group.
2. Edwards, C. Henry, Penney, David E., & Calvis, David T. (2015). **Differential Equations and Boundary Value Problems: Computing and Modeling (5th ed.)**. Pearson Education.
3. Ross, Shepley L. (2014). **Differential Equations (3rd ed.)**. Wiley India Pvt. Ltd.