

# Syllabus

Graphical, qualitative and stability theory: Representations of solutions of linear and nonlinear differential equation by graphs; the method of isoclines, Phase-plane, critical points, Classification and nature of critical points, Stability of critical point of linear and nonlinear systems. Simple discrete and continuous type population models: Malthusian model, Logistic growth model, Prey-Predator mode, Host-Parasite model & Harvesting model. Epidemic models: SI, SIS and SIR models, HIV/AIDs models. Cells and tumor growth: Concept of cells, CD4 T-cells, Modeling of tumor growth. Basic concepts of microbial growth models: Chemostat, Bacteria growth model, Enzyme kinetics.

## *Books Recommended:*

- S. L. Ross. Differential Equation
- J.D. Murray. Mathematical Biology I. An Introduction
- J.D. Murray. Mathematical Biology II. Spatial Models and Biomedical Applications.
- J.C. Frauenthal. Introduction to population modeling
- Britton Nicholas. Essential Mathematical Biology.
- Brain Ingalls. Mathematical Modeling in Systems Biology: An Introduction
- H.F. Freedman. Deterministic Mathematical models in population.