Department :Chemical Engineering **Division:** Chemical Engineering

Course Title : Mathematical Modeling in Chemical Engineering

- **Aim:**

Introduction to behavior of processes

- **Syllabus:**

✓ Mathematical modeling in transport phenomena
✓ Mathematical Modeling Steps
✓ Overview of Derivatives and Coordinate Axes
✓ Differential Form of conservation Laws(Continuity Equation, Mass conservation Law, Energy conservation Law, Momentum conservation law)
✓ Examples of Chemical Engineering Process Modeling) (Heat Transfer, Fluid Transfer, Simple Mass Transfer)
✓ Chemical, heat transfer and momentum combination, mass transfer and momentum, heat transfer combination
✓ Classification of Partial Differential Equations
✓ Analytical Methods for Solving Partial Differential Equations
✓ Separation Method, Solving Differential Equations in Cartesian ,Cylindrical, and Spherical Coordinates
✓ Solving Differential Equations with Inhomogeneous Boundary Conditions by Separation Method
✓ Solving Inhomogeneous Differential Equations by Variable Separation Method
✓ Method of combination of variables

- **Reading Resources:**

Process Modeling, Simulation, and Control for Chemical Engineers