

Approval: 4th Senate Meeting

Course Name: Topics on Semigroup Theory

Course Number: MA-780

Credits: 3-0-0-3(L-T-P-C)

Prerequisites: Real Analysis

Intended for: PG

Distribution: Elective

Semester: Odd/Even

Preamble:

Course Outline: This is an advance specialized course on nonlinear differential equations. This course will be useful for students who are interested in theoretical analysis of differential equations.

Modules: Linear dynamical systems (semigroup approach): Cauchy functional equation, finite dimensional system (matrix semigroups), uniformly continuous operator semigroups. [10 Lectures]

Semigroup generators and resolvents: Generator of semigroup and their resolvents, Hille Yosida generalization theorems, special classes of semigroups. [15 Lectures]

Spectral theory for semigroups and generators: Spectral theory for closed operators, spectrum of semigroups and generators. [10 Lectures]

Semigroups for population equations. [07 Lectures]

Textbooks:

1. V. Arnold, Ordinary differential equations, 1973.
2. Engel and Nagel, One-Parameter Semigroups for Linear Evolution Equations, Springer, 1999.

References:

1. Pazy, Semigroups of linear operators and applications to partial differential equations, Springer, 1983.
2. S. Kesavan, Nonlinear functional analysis, Hindustan, 2004.