MA465   Ordinary Differential Equations

Credit: 3-0-0-3

Prerequisites: - MA-101

Students intended for: B. Tech

Elective or core: Elective   Semester: Odd/Even

Course content:

- **Basic Theory:** Existence and uniqueness of solutions, continuation of solutions, global existence, dependence of solutions on initial conditions, regularity of the flow, First and second order differential equations, Contraction mapping principle.   [18 hours]

- **Linear Systems:** The fundamental matrix, Equilibrium points and their stability, Sturm-Liouvile theory.   [12 hours]

- **Nonlinear Systems:** The Poincare-Bendixon theorem, Perturbed systems, Lyapunov functional, Local and global analysis.   [10 hours]

Texts Books:

Arnold, V., *Ordinary Differential Equations*, MIT Press, 1978.

Coddington, E. A. and Levinson, N., *Theory of Ordinary Differential Equations*, Krieger Publishing Co, 1984.

Ahmad, S. Rao, M.R.M., Theory of ordinary differential equations with applications in biology and engineering, EWP publication, 1999.

Reference Books:

Perko, *Differential Equations and Dynamical Systems*, Springer.

Devaney, R., Hirsch, M. W. and Smale, S., *Differential Equations, Dynamical Systems, and an Introduction to Chaos* (2nd Edition), Academic Press, 2003.

Birkhoff, G. and Rota, G.-C., *Ordinary Differential Equations*, wiley, 1989.