Differential Geometry

Code:**MSM5011**

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3

Geodesics, Parallel Transport, Weingarten Map, Curvature of Plane Curves Arc length, Line integrals, Curvature of surfaces, Parametrized surfaces, Local equivalence of surfaces and parametrixed surfaces, Rigid motions and congruence, Isometrics.

References

1. T.A. Thorpe: Elementary Topics in Differential Geometry, Springer-Verlag .
2. Goursat, Mathematical Analysis,Vol.I.
3. Struik, Differential Geometry
4. Kreyszig, Introduction to Differential Geometry and Reimannian Geometry.
5. Christian Br, Elementary Differential Geometry, Cambridge University Press, 2010.
6. Sebastin Montiel and Antonio Ros, Curves and Surfaces, American Mathematical Society, 2009.
7. J. R. Munkres, Analysis On Manifolds, Westview Press, 1997.
8. Michael Spivak, Calculus On Manifolds: A Modern Approach To Classical Theorems Of Advanced Calculus, Westview Press, 1971.

Differential Topology

Code:**MSM5012**

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3

Euclidean Spaces, Topological Manifolds, Function of several Variable, Continuity and Differentiability of functions of several variables, Differentiable manifolds, Tangent Spaces, Inverse Function Theorem, Submanifolds, Local immersion theorem, local submersion theorem, differential forms, Integration on Manifolds, Stokes' Theorem, de Rham's theorem.

References

1. An Introduction to Differentiable Manifolds and Riemannian Geometry: William M. Boothby, Academic Press;
2. Foundations of differentiable manifolds and Lie groups: Frank W. Warner, Graduate texts in Mathematics, Springer;
3. Introduction to Smooth Manifolds: John M. Lee, Graduate texts in Mathematics, Springer.

Dynamical Systems

Code:**MSM5013**

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3

Review of Linear Systems.
Dynamical Systems and Vector Field, Fundamental Theorem, Existence and Uniqueness; Cont. of Solutions is initial conditions; extending solutions; global solutions; flow of a differential equation. Stability of Equilibrium Nonlinear sinks, stability, Liapunov functions, Gradient systems; The Poincare - Benedixton theorem and applications. Introduction to Discrete Dynamical Systems.

References

1. Hirsch M.W. and Smale S., DYNAMICAL SYSTEMS, Acad Press, 1974.
2. Holmgren R.A., A first course in discrete dynamics, Springer Verlag, 1994