**MA\*714 Differential Geometry**

Theory of Space Curves-The Serret-Frenet formulas. Gauss Theory of Surfaces- First and second fundamental form, Examples, Weingarten map, Principalcurvatures, Gaussian curvature, Examples. Computation of the curvature in standard spaces: Sphere, Torus, Surfaces of revolution etc. Levi-Civita connection Uniqueness, Gauss theorem Egregium, Hilbert’s theorem on the positivity of curvature at a point on a compact surface in R3. Geodesics, Equations of geodesics, Examples. Jacobi fields, Conjugate points etc. Riemannian area element on a surface, Gauss Bonnet theorem. Differentiable manifold, Differentiable structure. Sub-manifolds, Immersions, Embeddings. Metric tensor, Riemannian connection and curvature.

**References:**

1. Kuhnel, Wolfgang. Differential Geometry: Curves – Surfaces – Manifolds. Student mathematical library, vol. 16. Providence, RI: American Mathematical Society, 2002.
2. Spivak, Michael. A Comprehensive Introduction to Differential Geometry. Vol. 2. Boston, MA: Publish or Perish, 1999.
3. Pressley, Andrew. Elementary Differential Geometry. Springer undergraduate mathematics series. London, UK: Springer, 2002.