Syllabus for Elective paper of M. Sc II (Sem III) Elective II

MM 314 : Differential Geometry

Unit I (15 lectures)

1.1 Tangent vectors and tangent vector fields, frame fields.
1.2 Reparametrization of curves, standard curves.
1.3 Directional derivative
1.4 Differential forms
1.5 Speed of curve

Unit II (15 lectures)

2.1 Frenet formulas, Frenet frame fields
2.2 Isometries in E^3
2.3 Translation, Rotation, Orthogonal Transformation
2.4 Frenet approximation of curves
2.5 Covariant derivatives

Unit III (15 lectures)

3.1 Calculus on Surface
3.2 Co-ordinate patches
3.3 Surface, Surface of revolution
3.4 Patch Computation
3.5 Parametrization of a region X(D) in M
3.6 Differentiable functions and Tangent vectors

Unit IV (15 lectures)

4.1 Shape Operator
4.2 Normal curvature
4.3 Guassian and mean curvature
4.4 Special curves, principal curves
4.5 Asymptotic curves, Geodesics

Recommended Books:

1. O'Neill, B.: Elementary Differential geometry, Academic Press, London 1966

Reference Books:

2. Millman, R. and Parker, G.D. : Elements of differential geometry: Prentice-Hall of India Pvt. Ltd. 1977

3. Hicks, N. : Notes of differential geometry, Princeton University Press (1968)

4. Nirmala Prakash : Differential Geometry, Tata McGraw-Hill 1981