MM-05
OPTION (III). DIFFERENTIAL GEOMETRY OF MANIFOLDS

M.M. 100

(Questions will be set from each unit/section)

Units	Topics
I	Definition and examples of differentiable manifolds. Tangent spaces. Jacobian. One parameter group of transformations. Lie derivatives. Immersions and imbeddings. Distributions Exterior algebra. Exterior derivative.
II	Topological groups. Lie groups and lie algebras. Products of two Liegroups. One parameter subgroups and exponential maps. Examples of Liegroups. Homomorphism and Isomorphism. Lie transformation groups. General linear groups. Principal fibre bundle. Linear frame bundle. Associated fibre bundle. Vector bundle. Tangent bundle. Induced bundle. Bundle homomorphisms.
III	Riemannian manifolds. Riemannian connection. Curvature tensors. Sectional Curvature. Schur's theorem Geodesics in a Riemannian manifold. Projective curvature tensor. Conformal curvature tensor.
IV	Submanifolds & Hypersurfaces. Normals. Gauss formulae. Weingarten equations. Lines of curvatur. Generalized Gauss and Mainardi-Codazzi equations.
V	Almost Complex manifolds. Nijenhuis tensor. Contravariant and covariant almost analytic vector fields. F-connection.