

MT509: DIFFERENTIAL GEOMETRY-II

Syllabus: Geodesics; Differential equation of a geodesic; Single differential equation of a geodesic, Geodesic on a surface of revolution; Geodesic Curvature and Torsion; Gauss-Bonnet Theorem; Gauss's formulae; Gauss's characteristic equation; Weingarten equations, Mainardi Codazzi equations; Fundamental existence theorem for surfaces; Parallel surfaces; Gaussian and mean curvature for a parallel surface; Bonnet's theorem on parallel surfaces; Tensor Analysis; Kronecker delta; Contravariant and Covariant tensors; Symmetric tensors, Quotient law of tensors, Relative tensor; Riemannian space; Metric tensor; Indicator, Permutation symbols and Permutation tensors, Christoffel symbols and their properties; Covariant differentiation of tensors, Ricci's theorem, Intrinsic derivatives; Geodesics, Differential equation of geodesic, Geodesic coordinates, Field of parallel vectors; Riemann-Christoffel tensor and its properties; Covariant curvature tensor, Einstein space, Bianchi's identity. Einstein tensor. Flate space; Isotropic point. Schur's theorem.

UNIT SCHEDULE

- Unit 9** Geodesics; Differential equation of a geodesic; Single differential equation of a geodesic, Geodesic on a surface of revolution; Geodesic Curvature and Torsion; Gauss-Bonnet Theorem
- Unit 10** Gauss's formulae; Gauss's characteristic equation; Weingarten equations, Mainardi Codazzi equations; Fundamental existence theorem for surfaces; Parallel surfaces; Gaussian and mean curvature for a parallel surface
- Unit 11** Tensor Analysis; Kronecker delta; Contravariant and Covariant tensors; Symmetric tensors, Quotient law of tensors, Relative tensor
- Unit 12** Riemannian space; Metric tensor; Indicator, Permutation symbols and Permutation tensors, Christoffel symbols and their properties
- Unit 13** Covariant differentiation of tensors, Ricci's theorem, Intrinsic derivatives
- Unit 14** Geodesics, Differential equation of geodesic, Geodesic coordinates, Field of parallel vectors
- Unit 15** Riemann-Christoffel tensor and its properties; Covariant curvature tensor, Einstein space, Bianchi's identity. Einstein tensor. Flate space; Isotropic point. Schur's theorem