

## **FMCC1001 DIFFERENTIAL GEOMETRY(3-1-0)**

### **Module – I : (13 Hours) Tensors**

Tensor and their transformation laws, Tensor algebra, Contraction,

Quotient law, Reciprocal tensors, Kronecker delta, Symmetric and skew- symmetric tensors, Metric tensor, Riemannian space, Christoffel symbols and their transformation laws, Covariant differentiation of a tensor, Riemannian curvature tensor and its properties, Bianchi identities, Ricci-tensor, Scalar curvature, Einstein space.

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Syr Int. M.Sc in Math & Computing 2014-15

### **Module – II : (13 Hours) Curves in Space**

Parametric representation of curves, Helix , Curvilinear coordinates in  $E_3$ . Tangent and first curvature vector, Frenet formulas for curves in space, Frenet formulas for curve in  $E_n$ . Intrinsic differentiation, Parallel vector fields, Geodesic.

### **Module – III : (14 Hours) Surfaces**

Parametric representation of a surface, Tangent and Normal vector field on a surface, The first and second fundamental tensor, Geodesic curvature of a surface curve, The third fundamental form, Gaussian curvature , Isometry of surfaces, Developable surfaces, Weingarten formula, Equation of Gauss and Codazzi , Principal curvature, Normal curvature, Meusnier's theorem.

#### **Text Book :**

1. Tensor Calculus and Application to Geometry and Mechanics :  
(chapter-II and III) – I.S.SOKOLNIKOFF.
2. An Introduction to Differential Geometry:  
(chapter – I,II,III,V and VI) - T.J. WILMORE.

#### **References Book :**

1. Vector and Tensor Analysis : Lass, H, Mc Graw Hill
2. Tensor Analysis : Shanti Narayan, Academic Publishers
3. Differential Geometry : Weather burn, C.E.
4. Tensor Calculus - BARY SPAIN, Dover Publication