CE678A: Introduction to Geodesy   **3-0-0-0 [9]**

Course Contents:
Geometric geodesy: Datums Horizontal & Vertical, GRS80, WGS84, ITRF; Transformation of Coordinates from one datum to another. Mean Sea level, Geoid and MSL in India. Coordinate Systems in Geodesy, Geometry of Ellipsoid, level Surface and Plumb Line, Deflection of vertical, Geoidal Separation, Natural Coordinates, Astrogeodetic deflection. Physical geodesy: Fundamentals of potential theory, Laplace Equation in spherical coordinates, Solution of Laplace Equation, Brun's formula, Fundamental equation of Physical Geodesy, Stokes' Formula, Gravity, Gravitational Potential and Gravity potential, Anomalous Gravity field, Gravity Anomaly, Gravity reductions: Free Air, Bouger and Isostatic reduction, Earth Gravity Models, Potential number and different height systems. Map Projection: Introduction to Map projection, Purpose and methods of Map projection and their classification. Conformal Map projections; LCC and Transverse Mercator Projections; Indian Grid System and UTM; Astronomy: Celestial Sphere, Definition of terms in Astronomy, Celestial coordinate systems, Variations in Celestial coordinates. Precession and Nutation; Time systems; Sidereal time, Ephemeries time, Atomic time; Rotational Time systems: UT0, UT1, UT2, CIO and Polar motion, Earth Rotation parameters and Leap second. Satellite geodesy: Introduction to Satellite Geodesy, Keplerian Motion, Geometry of ellipse, Kepler ellipse in space; perturbed satellite motion, Lagrange's and Gaussian form of perturbation equations. Introduction to GNSS satellite systems; Satellite Laser ranging, Satellite Altimetry; VLBI;