Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE307	**GEOMATICS**	**3-0-0-3**	**2016**

Prerequisite : CE207 Surveying

Course objectives:
- To impart awareness on the advanced surveying techniques
- To understand the errors associated with survey measurements
- To provide a basic understanding on geospatial data acquisition and its process

Syllabus:

Traverse Survey, Curve Surveying, Global Navigation Satellite System, Global Positioning Systems, Remote Sensing, Geographical Information System

Course Outcomes:

- The students will possess knowledge on the advanced methods of surveying, the instruments and the spatial representation of data.

Text Books / References:
1. Dr. B.C. Punmia , Ashok Kumar Jain & Arun Kumar Jain - Surveying , Laxmi publications (P) Ltd , 2005
2. Prof. T.P. Kenetkar and Prof. S.V. Kulkarni - Surveying and Levelling, Pune Vidyarthi Griha Prakashan,2004
3. R.Agor - A Text book of Surveying and Levelling, Khanna Publishers, 2005
4. S.K. Duggal - Surveying Vol. II, Tata McGraw Hill Ltd ,Reprint 2015

References :
1. Burrough P , Principles of Geographical Information systems, Oxford University Press, 1998
2. Chang,K , "Introduction to Geographic Information Systems", Tata McGraw-Hill Publishing Co. Ltd, 2008
3. George Joseph, "Fundamentals of Remote Sensing", University Press, 2003
4. Iliffe, C.J., Datums and Map Projections for Remote Sensing, GIS and Surveying, Whittles Publishing, 2006
5. James M Andersen, Edward M Mikhail, Surveying Theory and Practice, McGraw Hill education, 7e, 1998
6. Kang-tsung Chang, 'Introduction to GIS' , Tata McGraw-Hill Publishing Co. Ltd, 8e, 2016
7. Lillesand M and Kiefer W, "Remote Sensing and Image Interpretation". John Wiley and Sons,Inc., 2000

COURSE PLAN			
Module	Contents	Hours	Sem. Exam Marks %
I	**Traverse Surveying -** Methods of traversing, Checks in closed traverse, Traverse computations, Balancing the traverse- methods	6	15

II	**Curve Surveying** – Elements of simple and compound curves – Method of setting out– Elements of Reverse curve (Introduction only)– Transition curve – length of curve – Elements of transition curve - Vertical curve (introduction only)	8	15
	FIRST INTERNAL EXAMINATION		
III	**Global Navigation Satellite System-** Types**, Global Positioning Systems**-Components and Principles, Satellite ranging-calculating position, Satellite signal structure, code phase and carrier phase measurements, GPS errors and biases, Application of GPS	6	15
IV	**GPS Surveying methods**-Static, Rapid static , Kinematic methods – DGPS, Phases of GPS Survey -Planning and preparation, Field operation-horizontal and vertical control, data sheet, visibility diagram, Processing and report preparation,	6	15
	SECOND INTERNAL EXAMINATION		
V	**Remote Sensing** : Definition- Electromagnetic spectrum-Energy interactions with atmosphere and earth surface features-spectral reflectance of vegetation, soil and water- Classification of sensors-Active and Passive, Resolution-spatial, spectral radiometric and Temporal resolution, Multi spectral scanning-Along track and across track scanning	8	20
VI	**Geographical Information System**-components of GIS, GIS operations, Map projections- methods, Coordinate systems-Geographic and Projected coordinate systems, Data Types- Spatial and attribute data, Raster and vector data representation-Data Input methods-Geometric Transformation-RMS error, Vector data Analysis-buffering, overlay.	8	20
	END SEMESTER EXAMINATION		

QUESTION PAPER PATTERN (End semester exam)

Maximum Marks :100   **Exam Duration: 3 Hrs**

Part A -Module I & II   :   2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI :   2 questions out of 3 questions carrying 20 marks each

 Note : 1.Each part should have at least one question from each module

        2.Each question can have a maximum of 4 subdivisions (a, b, c, d)