B.Tech. in Civil Engineering

Course code: Course Title	Course Structure			Pre-Requisite
	L	T	P	
CE207: Surveying and Geoinformatics	3	0	2	NIL

Course Objective: To familiarize the students with the concepts of the subject and its related applications in Civil Engineering.

S. No	Course Outcomes (CO)
CO1	To develop an understanding of the basic concepts of surveying.
CO2	To understand the use of different surveying instruments.
CO3	To conceptualize how to use a set of survey techniques and equipment optimally.
CO4	Understand the basic concept of Remote Sensing and know about different types of satellites, sensors, and data.
CO5	Apply the concepts of photogrammetry and its applications, such as the determination of the heights of objects on terrain.

S. No	Contents	Contact Hours
UNIT 1	**Introduction: Importance of Surveying to Engineers;** Plane and Geodetic surveying, Classification of surveys, Basic Principles of Surveying, Types of maps, scales, and uses, plotting accuracy, map sheet numbering, coordinate and map projection. Organization of field and office work. Project Surveys, Hydrographic Survey, Astronomy and Map making in India: General requirement and specifications of Engineering project surveys, Reconnaissance, Principles and practices, construction surveys, location and layout surveys. Hydrographic survey, shoreline, tidal and river surveys, soundings in hydrographic survey, Terms in astronomical survey, basics of spherical trigonometry. Map in the making-survey of India publication, conventional symbol charts, and different types of maps.	8
UNIT 2	**Survey Instruments, Measurement of Distances, Angles, Azimuths:** Introduction to surveying equipment, chains, tapes, compasses, theodolites, tacheometers, EDM, total Stations, and other instruments, types of errors, sources of errors, and precautions. **Chain, Compass and Plane Table Surveys:** Chain survey procedures, errors and corrections, planning and carrying out a chain survey. Compass survey, types of compasses, and various terms related to magnetic compass, computing, and plotting a traverse. Plane table surveys and mapping.	8
UNIT 3	**Surveying Methods and Techniques -** Levelling and measurement of elevations, different methods of levelling. Methods of control establishment, traversing, triangulation, trilateration, computation of coordinates, trigonometrical levelling, theodolite surveying and tachometry, contouring,	8

	Curves: curve layout, horizontal, transition and vertical curves, Different types of survey projects.	
UNIT 4	**Geoinformatics:** Geospatial Sciences and Geospatial Technologies, Remote sensing, History of Remote Sensing, Remote sensing components, Sources of Energy, Electromagnetic spectrum, Spectral reflectance and reflectance curves, Radiation and Radiation Calculation, **Platforms and Sensors:** Orbital movement and Earth coverage. Types of Orbits, Types of resolutions, Active and passive remote sensing, Sensor's characteristics, Light and Earth surface Interactions, Indian Remote Sensing Satellite Program, Other satellites. GIS, Components of GIS, Raster and Vector data types, GIS Applications, Basic concepts of Geodesy and its Applications	8
UNIT 5	**Aerial Photography, Photogrammetry and Digital Image Processing:** Introduction, Early history of aerial photography, Basic principles of photogrammetry, image parallax, ground control for aerial photography, production of maps and ortho-photos, flight planning. Visual Image Interpretation: Introduction, fundamentals of Visual image interpretation, basic equipment used, elements of visual image interpretation, methods of search, and applications of visual image interpretation. **Digital Image Processing:** Introduction, image rectification and restoration, image enhancement, classification stage, training stage, hybrid classification, output stage, accuracy assessment, **Remote sensing data collection:** Types and Sources of Remote Sensing data, digital image data formats. Data Visualisation, DEMs, Image Processing Software.	10
	Total	**42**

REFERENCES

S. No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Punmia, B. C., "Surveying", Vol. II & III, Laxmi Publications, New Delhi(ISBN 69-85-0743-2)	2000
2	Kennie, T. J.M. and Petrie, G., "Engineering Surveying Technology", Blackie & Sons Ltd, London. (ISBN 39-12-6050-8)	1998
3	Bannister, A. and Baker, R., "Solving Problems in Surveying", Longman Scientific Technical, U.K. (ISBN 19-45-2494-7)	2000
4	Arora, K. R., "Surveying", Vol. II & III, Standard Book House, Delhi (ISBN 644-23-0774-4)	1999
5	Jensen, J.R., Digital Image Processing- A Remote Sensing Perspective, 4th ed., Pearson Education.	2000
6	Chandra, A.M. and Ghosh, S.K., "Remote Sensing and Geographical Information System", Narosa.	2000
7	Schowengerdt, R.A., "Remote Sensing – Models and Methods for Image Processing", Academic Press	2000