23CE21T1 SURVEYING

Course Category	Professional Core	**Credits**	3
Course Type	Theory	**Lecture – Tutorial –Practical**	2-1-0
Prerequisite	-	**Sessional Evaluation**	30
		Semester End Exam. Evaluation	70
		Total Marks	100

Course Objectives	1. To know the principle and methods of surveying and measuring of horizontal and vertical distances and angles. 2. To identify source of errors and know the rectification methods. 3. To know surveying principles to determine areas and volumes. 4. To know the Setout of curves and learn the use modern surveying equipment. 5. To know the basics of photogrammetry in surveying.		
Course Outcomes	COs	Statements	Blooms Level
	CO1	Apply the principle and methods of surveying for measuring the horizontal and vertical distances and angles.	L2
	CO2	Identify the sources of errors and apply the appropriate rectification methods.	L3
	CO3	Apply surveying principles to determine areas and volumes.	L2
	CO4	Setout the curves and able to use the modern surveying equipment.	L3
	CO5	Apply the basics of photogrammetry in surveying.	L4

Course Content

UNIT I

Introduction and Basic Concepts: Introduction, Objectives, Classification and principles of surveying, Surveying accessories; Introduction to Compass, leveling and Plane table surveying.

Linear distances: Approximate methods; Direct Methods - Chains, Tapes, ranging, Tape corrections.

Prismatic Compass: Bearings, Included angles, Local Attraction, Magnetic Declination and dip; Whole Circle Bearing (WCB) and Quadratic Bearing (QB) systems for locating bearings.

UNIT II

Leveling: Types of levels, Methods of levelling, Classification of levelling, methods of reduction of levels and Determination of levels; Effect of curvature of earth and refraction.

Contouring: Characteristics and uses of contours, Methods of contour surveying.

Areas: Determination of areas consisting of irregular boundary and regular boundary.

Volumes: Determination of volume of earth work in cutting and embankments for level section, Capacity of reservoirs.

UNIT III

Theodolite Surveying: Types of Theodolites, Temporary adjustments, Measurement of horizontal angle by repetition method and reiteration method, Measurement of vertical angle; Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods of traversing, Traverse computations and adjustments, Introduction to omitted measurements.

UNIT IV

Curves: Types of curves and their necessity; Elements of simple, compound and reverse curves; Introduction to tacheometric surveying.

Modern Surveying Methods: Principle and types of Electronic Distance Measurement (EDM) Instruments; Total station - Advantages and applications; Introduction to Global Positioning System (GPS); Introduction to drone survey and LiDAR (Light Detection And Ranging) survey.

UNIT V

Photogrammetry Surveying: Introduction, Basic concepts, Perspective geometry of aerial photograph, Relief and tilt displacements, Terrestrial photogrammetry, Flight planning; Stereoscopy, Ground control extension for photographic mapping- Aerial triangulation, Radial triangulation, Methods;

	Photographic mapping- Mapping using paper prints, Mapping using stereo-plotting instruments; Mosaics; Map substitutes.
Textbooks and Reference books	**Textbooks:** 1. SK. Duggal, *"Surveying (Vol -1 & 2)"*, McGraw Hill Education (India) Pvt. Ltd., 5th edition, 2019. 2. N. N. Basak, *"Surveying and leveling"*, McGraw Hill Education (India) Pvt. Ltd, 2nd edition, 2014. 3. B. C. Punmia, Ashok K Jain and Arun K Jain, *"Surveying Vol.I"*, Laxmi Publications, 17th edition, 2016.
	Reference Books: 1. Dr. K.R. Arora *"Surveying Vol-I, II and III"*, Standard Book House, 17th edition, 2019. 2. T.P.Kanetkar and S.V.Kulkarni, *"Surveying and Levelling"*, Vidyarthi Griha Prakashan publishers, Pune, 2010. 3. A. M. Chandra, *"Plane Surveying"*, New Age International Ltd. Publishers, 3rd edition, 2018.
E-resources	1. https://archive.nptel.ac.in/courses/105/104/105104101/ 2. https://gisgeography.com/what-is-photogrammetry/

CO-PO Mapping: 3-High Mapping, 2-Moderate Mapping, 1-Low Mapping, - -Not Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	-	1	-	-	-	-	-	-	-	-	1	-	-	1	-
CO2	3	2	-	1	1	1	-	-	-	-	1	2	-	2	-
CO3	3	2	-	1	-	-	-	-	-	-	-	1	1	1	-
CO4	3	2	-	1	-	-	-	-	-	-	-	1	2	1	2
CO5	2	1	-	2	3	2	1	-	-	-	3	2	2	2	1