SURVEYING AND GEOMATICS

Course Code: 22CE1101	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Outcomes:
At the end of the course the student will able to:

CO1: Determine horizontal and angular measurements, measure levels and draw contours (L3)
CO2: Calculate the areas of irregular boundaries, volumes of borrow pits, embankments and capacity of reservoirs (L3)
CO3: Demonstrate the theodolite traversing and different types of horizontal curves (L3)
CO4: Discuss the applications and importance of Total station, GPS and EDM (L2)
CO5: Explain about Photogrammetric surveying (L2)

UNIT–I **(10 Lectures)**

INTRODUCTION TO SURVEYING:
Principles, Linear, Angular, Survey stations, Survey lines- ranging, Bearing of survey lines.

LEVELLING:

Principles of leveling - booking and reducing levels; differential, reciprocal leveling, profile leveling and cross sectioning. Errors in leveling.

CONTOURING: Characteristics, methods, uses.

Learning outcomes:

At the end of this unit, the student will be able to

1. discuss the basic procedures in surveying (L2)
2. calculate errors in leveling (L3)
3. explain the contour maps (L2)

UNIT–II **(10 Lectures)**

AREAS AND VOLUMES:

Area from field notes, Computation of areas along irregular boundaries and areas consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes. Determination of the capacity of the reservoir. Volume of borrow pits.

Learning outcomes:

At the end of this unit, the student will be able to

1. calculate areas using different methods (L3)
2. determine volume of borrow pits (L3)
3. determine the capacity of the reservoir (L3)

UNIT-III **(10 Lectures)**

TRIGONOMETRIC LEVELING AND CURVES:

Theodolite Surveying: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods -triangulation: - Inter-visibility of height and distances - Trigonometric leveling - Axis single corrections. Traversing – Types, balancing the traverse.

Curves: Elements of simple and compound curves – Method of setting out.

Learning outcomes:

At the end of this unit, the student will be able to

1. determine the angles using Theodolite (L3)
2. discuss trigonometric leveling (L2)
3. explain the Setting of simple and compound curve (L2)

UNIT–IV **(10 Lectures)**

MODERN FIELD SURVEY SYSTEMS:

Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Total Station – Parts of a Total Station – Accessories –Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS, Coordinate transformation, accuracy considerations.

Learning outcomes:

At the end of this unit, the student will be able to

1. describe the distance measurements using modern field survey systems (L2)
2. discuss the Total Station surveying (L2)
3. discuss the surveying using GPS (L2)

UNIT-V **(10 Lectures)**

PHOTOGRAMMETRY SURVEYING:

Introduction, Basic concepts on maps and aerial photographs, 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.

Learning outcomes:

At the end of this unit, the student will be able to

1. explain basic concepts on maps and aerial photographs (L2)
2. differentiate between aerial and radial triangulation (L2)
3. discuss the photographic mapping (L2)

Text books:

1. Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain, *Surveying (Vol–1,2 & 3)*, 18th Edition, Laxmi Publications (P) Ltd., New Delhi, 2016.
2. Duggal S K, *Surveying (Vol – 1&2)*, 5th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2017.

References:

1. Arthur R Benton and Philip J Taety, *Elements of Plane Surveying*, 8th Edition, McGraw Hill-2000, 2010.
2. Arora K R, *Surveying (Vol 1, 2 & 3)*, 9th Edition, Standard Book House, Delhi, 2018.
3. Chandra A M., *Plane Surveying*, 3rd Edition, New Age International Pvt. Ltd., Publishers, New Delhi, 2015.
4. Subramanian, R., *Surveying and Levelling*, 2nd Edition, Oxford University Press, New Delhi, 2012.

Web References:

1. https://nptel.ac.in/courses/105/104/105104101/
2. https://nptel.ac.in/courses/105/107/105107122/
3. https://nptel.ac.in/courses/105/103/105103176/