

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CIVIL ENGINEERING)
SEMESTER	4
COURSE TITLE	ADVANCED SURVEYING
COURSE CODE	09CI3405
COURSE CREDITS	1

Objective:

- 1 To understand the principles of Electronic Distance Measurement equipment and Totalstation and their use
- 2 To know methods of Theodolite surveying and their use. 3 To learn tachometric surveying and curve setting.
- 3 To understand the principles of Electronic Distance Measurement equipment and Total station and their use
- 4 To know the concept of remote sensing, GPS and GIS.

Course Outcomes: After completion of this course, student will be able to:

- 1 Use Theodolite for the measurement of horizontal and vertical angle
- 2 Calculate the height of objects through a trigonometric leveling
- 3 Explain the principles and various methodologies involved in tachometry.
- 4 Retrieving the data and generate the drawings using advanced surveying equipment & application software.
- 5 Apply modern surveying techniques such as total station, GPS, and GIS tools for data acquisition, processing, and mapping in civil engineering projects.

Pre-requisite of course: Basic Surveying

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	2	0	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Theodolite Surveying and Angle Measurement Introduction to the Theodolite and its uses in surveying, Identification of various parts of the theodolite (telescope, vernier scale, leveling screws, tripod, etc.), Temporary adjustments of the theodolite (centering, leveling, focusing), Measurement of horizontal angles by Repetition method, Measurement of horizontal angles by Reiteration method, Measurement of vertical angles using the theodolite, Sources of errors in theodolite surveying (instrumental, personal, natural errors), vDemonstration and analysis of different types of errors in observations	0
2	Trigonometric Levelling and Data Computation Introduction to trigonometric levelling and its applications, Determination of elevation using trigonometric principles, Calculation of Reduced Levels (R.L.) using vertical angle and distance, Determining distance and R.L. of a point when the line of sight is horizontal, Preparation and calculation of Gale's table for leveling data, Examples and practice problems related to elevation and distance calculations, Assigning weights to observations and importance in surveying computations	0
3	Tacheometry and Contour Surveying Introduction to Tacheometry and its advantages, Determination of tacheometric constants (multiplying constant and additive constant), Measurement of distance and elevation using tacheometry, Principles of contour surveying and its importance in civil engineering, Methods of contouring (direct and indirect methods), Project work on contour survey and preparation of contour maps	0
4	Advanced Surveying Equipment and Modern Techniques Introduction to advanced surveying instruments and modern techniques, Demonstration and working of Total Station, Features and advantages of total station over conventional instrument, Basics of Aerial Photogrammetry, Introduction to plane table surveying, Plane table methods: Radiation, Intersection, Traversing, Resection Practical applications and limitations of plane table surveying	0
Total Hours		0

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment 1 Study of Theodolite – Identify various parts of theodolite and their functions	2
2	Experiment 2 Temporary Adjustments of Theodolite – Perform setting, centering, leveling, and focusing	2
3	Experiment 3 Horizontal Angle by Repetition – Measure horizontal angle using repetition method	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
4	Experiment 4 Horizontal Angle by Reiteration – Measure multiple horizontal angles using reiteration method	2
5	Experiment 5 Vertical Angle Measurement – Determine vertical angles using theodolite	2
6	Experiment 6 Elevation by Trigonometry – Find elevation of objects using trigonometric method	2
7	Experiment 7 Contour Survey – Conduct fieldwork and prepare contour map (project)	6
8	Experiment 8 Tacheometric Constants – Determine multiplying and additive constants	2
9	Experiment 9 Errors in Surveying – Demonstrate instrumental, personal, and natural errors	2
10	Experiment 10 Weights to Observations – Solve examples on assigning weights to observations	2
11	Experiment 11 Total Station – Demonstration of setup and working of total station	2
12	Experiment 12 Photogrammetry & Plane Table – Study aerial photogrammetry and plane table methods (radiation, intersection, traversing)	2
Total Hours		28

Textbook :

- 1 Surveying and Levelling Vol-II, Dr. B. C. Punmia , Laxmi Publication, 2019
- 2 Surveying and Levelling Vol II, S.S. Bhavikatti , I. K. International, New Delhi., 2018

References:

- 1 Surveying and Levelling Vol-I & I, Surveying and Levelling Vol-I & I, S. K. Duggal, Mc Graw hill, 2018

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
25.00	35.00	40.00	0.00	0.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon students' content requirements and needs. In addition to conventional teaching method by a blackboard, the teacher may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs, etc.
- 2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom
- 3 Practical examination will be conducted at the end of the semester for evaluation of the performance of students in the laboratory
- 4 Students will use supplementary resources such as videos, e-courses, virtual laboratory.

Supplementary Resources:

- 1 <https://www.digimat.in/nptel/courses/video/105107121/L01.html>