



Semester – IV

Subject Name: Advance Surveying

Subject Code: 09CI1405

Diploma Branches in which this subject is offered: Civil Engineering

Objective: Objectives of introducing this subject at first year level in the branches are:

1. Prepare survey maps/drawing after carrying out different kinds of field surveys using advance surveying equipment.
2. Find out various physical quantities like length, area, volume, elevations, angles, latitude, departure, etc by interpreting survey drawings.

Credits Earned: 2

Course Outcomes:

On the completion of the 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 trigonometrical levelling.
3. Explain the principles and various methodologies involved in techeometry.
4. Retrieving the data and generate the drawings using advanced surveying equipment & application software.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
0	0	4	2	00	30	20	25	25	100



Contents:

Unit	Topics	Contact hours	Weightage (%)
1	<u>Theodolite</u> <ul style="list-style-type: none">➤ Introduction & Application of theodolite➤ Temporary and permanent adjustment of a theodolite➤ Definitions and various technical terms➤ Techniques for measuring horizontal angles and vertical angles➤ Other Application of Theodolite➤ Errors in theodolite work➤ Traversing using theodolite➤ Closing errors and Balancing of traverse➤ Gale's Traverse Table➤ Examples	14	25
2	<u>Trigonometrical Levelling</u> <ul style="list-style-type: none">➤ Introduction on trigonometric levelling➤ Techniques of observations (Direct and Reciprocal)➤ Techniques of determining the elevation of a particular point➤ Examples	8	14
3	<u>Tacheometry</u> <ul style="list-style-type: none">➤ Introduction on tacheometry➤ Purpose and Principles of tacheometric surveying➤ Instruments used in Tacheometry➤ Theory of Stadia Tacheometry➤ Anallatic Lens➤ Techniques of Determining Tacheometer constants➤ Examples on Tacheometer constants➤ Techniques of Tacheometry (Stadia & Tangential)➤ Advantages and disadvantages of Tangential method➤ Examples on Horizontal Distance and R.L.	14	25
4	<u>Curves</u> <ul style="list-style-type: none">➤ Introduction & types of curves➤ Definitions and notations➤ Designation of curve➤ Relation between Radius and degree of curve➤ Elements of simple circular curve➤ Setting out simple circular curve➤ Techniques of setting out simple circular curves➤ Transition curves and its requirements➤ Vertical curves➤ Examples on curves	10	18
5	<u>Advanced Survey Equipments</u> <ul style="list-style-type: none">➤ Introduction on advance surveying equipments➤ Basics of Digital Theodolite	10	18



	<ul style="list-style-type: none"> ➤ Introduction and Principles of E.D.M. ➤ Introduction and Basics of Total station <ul style="list-style-type: none"> - Parts of Total station - Advantages, disadvantages and uses of Total Station - Types of Total Station - Advancement in Total Station Technology - Automatic Target Recognition ATR ➤ Surveying using Total Station <ul style="list-style-type: none"> - Flow chart of data collection - Fundamental Parameters of Total Station ➤ Precautions to be taken while using Total Station ➤ Field equipments ➤ Set up of Total Station <ul style="list-style-type: none"> - Centering, Levelling, back-sight, Azimuth Marks ➤ Measurement with Total Station ➤ Total Station Traversing 		
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Suggested List of Presentation/Demonstration/Experiments & Calculations:

Sr. No.	Unit No.	Name of Topics	Hours
1.	1.	Identify various parts of the theodolite	4
2.	1.	Measure the horizontal angle by Repetition, Reiteration	4
3.	1.	Measure the vertical angle	4
4.	1.	Calculate the data for Gale's table	2
5.	2.	Practical to find Elevation by using Trigonometry	8
6.	3.	Project on Contour Survey	6
7.	3.	Determining the tacheometric constant	4
8.	3.	Determine the distance and R.L. of a point when line of sight is horizontal.	4
9.	4.	Setting out of Simple Circular Curve (Using Different Methods)	4
10.	4.	Determine the data for setting out curve By Rankine (one theodolite) method	6
11.	5.	Demonstration of measuring the horizontal Angle and vertical angle (Using Total Station)	10



Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

- a. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory.
- b. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- c. Students will use supplementary resources such as online videos, videos, e-courses, Virtual Laboratory.

Text Books:

- 1) Surveying and Levelling Vol-I & Vol-II by Dr. B. C. Punmia

Reference Books:

- 1) Surveying and levelling Vol-I & Vol-II by T. P. Kanetkar & S. V. Kulkarni
- 2) Surveying and Levelling Vol-I & Vol-II by Dr. B. C. Punmia
- 3) Surveying and Levelling Vol-I & Vol-II by Hussain & Nagrani
- 4) Surveying and Levelling Vol-I & Vol-II by S. K. Duggal
- 5) Fundamentals of Surveying by S. K. Roy
- 6) CD Program on GPS and GIS by Learning Materials Development Project