



16CE204 SURVEYING-I

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
45	-	30	20	48	6	12	3	2

Course Description and Objectives:

This course provides knowledge on various equipments for land surveying, such as chains, tapes, compass, theodolites and plane tables along with their accessories. The objective of this course is to impart knowledge of various surveying instruments to find out horizontal and vertical measurements.

Course Outcomes:

The student will be able to:

- measure all the land details including horizontal distances, elevations, and areas with chain, compass, and levelling instruments.
- find horizontal and vertical angles to simplify the calculations involved in height and distance measurements of inaccessible points.
- utilise Compasses and Theodolites to construct closed and open traverses for finding out land areas in large scales.

SKILLS:

- ✓ Draw a contour map by taking levels using auto level.
- ✓ Create a longitudinal profile of a road.
- ✓ Create a transverse profile of a road.
- ✓ Map an area using chain survey.
- ✓ Map an area using compass survey.

UNIT - 1**L-09**

SURVEYING AND MEASUREMENTS: Surveying, History, Definition, Classification, Principles of surveying, Plan and map, Measurements, Basic Measurements and methods, Scale, Scales used for Maps and plans.

CHAIN SURVEYING: (Linear Measurements) Different methods, Ranging out, Chaining a line on a flat ground, Chaining on an uneven or a sloping ground, Chain and Tape corrections, Degree of accuracy, Principles of chain surveying, Basic definitions, Well, Conditioned Triangle, Instruments used in chain survey, Field book, Field work, Offsets, Cross Staff survey, Obstacles in chain survey.

UNIT – 2**L - 09**

COMPASS SURVEYING: COMPASS: Types, Bearings and Angles, Prismatic compass, Magnetic Dip and Declination, Local attraction, Compass traversing, Fieldwork, Plotting of a compass traverse, Errors in Compass surveying, Limits of accuracy.

UNIT – 3**L - 09**

SIMPLE LEVELLING: Basic definitions, Curvature and Refraction, Different methods of levelling, Classification of direct levelling methods, Levels, Dumpy level, Tilting level, Auto level, Sensitivity of a level tube, Levelling staff, Level field book, Profile levelling, Cross sectioning, Reciprocal levelling, Sources of errors in levelling, Degree of Precision.

CONTOURING: Methods of representing Relief, Contouring, Contour interval, Characteristics of contours; Methods of locating contours, Direct and indirect methods contouring, Interpolation and sketching of contours, Location of a contour gradient, Ceylon Ghat Tracer, Uses of contour maps, Indian Pattern Tangent Clinometers.

UNIT – 4**L - 09**

VERNIERTHEODOLITE: Basic definitions, Fundamental lines and desired relations, Temporary adjustments, Measurement of a horizontal angle, Repetition and reiteration methods of horizontal angle measurement, Measurement of vertical angle, Sources of errors in Theodolite survey.

UNIT – 5**L - 09**

PLANE TABLE SURVEYING: Plane table and its accessories, Setting up, Plane tabling methods, Resection by trial and error method, Three point problem, Errors in plane tabling.

ERRORS IN SURVEYING: Accuracy, Precision, Sources of errors, Types of errors and their propagation, Measures of precision, Weights of measurements, Degree of accuracy.

ACTIVITIES:

- *Transfer Benchmark from near-by established control points.*
- *Take details of an area using prismatic compass.*
- *Map a large area by using plane table after doing resection using two and three point problem methods.*
- *Create a contour map using auto-level by shifting the instrument.*

LABORATORY EXPERIMENTS

ACTIVITIES:

- *Transfer Benchmark from near-by established control points.*
- *Take details of an area using prismatic compass.*
- *Map a large area by using plane table after doing resection using two and three point problem methods.*
- *Create a contour map using auto-level by shifting the instrument.*

LIST OF EXPERIMENTS

Total hours: 30

Chain & Compass Survey

1. Chaining of a line using Chain / Tape and Recording of details along the chain line.
2. Measurement of area – Cross staff survey.
3. Traversing by compass and graphical adjustment.
4. Determination of distance between two inaccessible points.

Simple Levelling

5. Measurement of elevation difference between two points using any levelling Instrument
6. Elevation difference between two points by reciprocal levelling method.
7. Profile levelling – plotting of profile.
8. Contouring of a small area by method of blocks using plane table survey
9. Determination of the distance between two inaccessible points.
10. Plotting of a building by plane table traversing
11. Resection by trial and error method by using theodolite
12. Measurement of horizontal and vertical angles.
13. Determination of distance between two inaccessible points.

TEXT BOOKS:

1. B. C. Punmia, "Surveying" Vol.1 and 2, 15th edition, Laxmi publishers, 2005.
2. Dr. K. R. Arora, "Surveying" Vol. 1, 10th edition, Standard Book House, 2008.

REFERENCE BOOKS:

1. A. M. Chandra, "Plane Surveying", 2nd edition, New Age International (P) Ltd. 2006.
2. Arthur Bannister and Stanly Reymond, "Surveying", 7th edition, Prentice Hall and Reymand Baker Addison - Wesley, 1998.