COURSE TITLE : SURVEYING-1
COURSE CODE : 2011
COURSE CATEGORY : B
PERIODS/WEEK : 4
PERIODS/SEMESTER: 60
CREDITS : 4

TIME SCHEDULE

Module	Topics	Period
1	Introduction to surveying Chain surveying Plane table surveying	15
2	Chain and compass traverse	13
3	Fundamentals of Levelling	16
4	Longitudinal levelling, cross sectioning, contouring and permanent adjustment	16
TOTAL		**60**

COURSE OUTCOME

Sl.	Sub	Student will be able to
1	1	Understand the different types of surveying instruments
	2	Comprehend the process involved in taking linear and angular measurements
	3	Understand the uses of different methods for finding the area of a given land
2	1	Prepare the lay out and map of an area
	2	Find the elevations of ground points
	3	Comprehend the system of Setting out alignments for roads , railways, canals etc.
3	1	Identify and plot the topography of an area Prepare contour map
	2	Compute the area and volume from a given contour map Understand the adjustment of instruments

SPECIFIC OUTCOME

Upon completion of the study, the student should be able to:

MODULE - I

1.1.0 Understand the purpose of surveying.

1.1.1 Define surveying
1.1.2 Know principles of surveying
1.1.3 Understand the classification of surveying.
1.1.4 Understand the phases of survey- reconnaissance survey and detailed survey.
1.1.5 Know the units of measurements.
1.1.6 Know linear and angular measurements.

1.2.0: Apply the principles of chain survey to make survey plans

1.2.1 Know the different types of chain and tape.
1.2.2 Know the factors involved in selecting stations.
1.2.3 Differentiate base line, check line and tie line.
1.2.4 Know the different operations in chain surveying
1.2.5 Understand the methods of setting out right angles
1.2.6 Know the methods of chaining on sloping ground
1.2.7 List the errors in chaining
1.2.8 List the obstructions in chaining
1.2.9 Know the plotting of field notes and conventional sign
1.2.10 Calculate the area of the plot by cross staff survey and triangulation.(simple problems)

1.3.0: Comprehend the principles of plane table survey.

1.3.1 Understand the principle of plane tabling-parallelism.
1.3.2 Identify the functions of accessories of plane table.
1.3.3 List the operation to set up and orient the plane table.
1.3.4 Describe the methods of plane tabling-radiation, intersection, traversing and resection.

MODULE-II

2.1.0: Apply the principles of compass survey in preparing survey plan.

2.1.1 List the type of compass.
2.1.2 Identify the parts of prismatic compass and their functions.
2.1.3 Understand the concept of meridian and types of meridian.
2.1.4 Define the bearing of a line and the types such as true bearing, magnetic bearing and arbitrary meridian.
2.1.5 Explain the field works in compass survey.
2.1.6 Understand the method of booking of field notes.
2.1.7 Calculate reduced bearing from whole circle bearings- problem.
2.1.8 Calculate the included angles from whole circle bearings.
2.1.9 Understand magnetic dip and declination.
2.1.10 List the sources in errors in compass surveying.

2.1.11 Understand local attraction, its detection and correction (description only).

2.2.0: Explain the procedure of plotting compass traverse.

2.2.1 Understand the closing error.

2.2.2 Adjustments of closing error.

MODULE - III

3.1.0: Apply the principle of leveling.

3.1.1 Define leveling.

3.1.2 Understand the concept of level surface, datum, horizontal surface, vertical surface and reduced level.

3.1.3 Understand the Bench mark and its types.

3.1.4 Understand the function of levelling instrument and list the types.

3.1.5 Identify the part of dumpy level and tilting level.

3.1.6 Understand the important axis of dumpy level and their relations.

3.1.7 Explain the temporary adjustments of leveling instrument.

3.1.8 Know the sensitiveness of bubble tube.

3.1.9 List the types of leveling staff.

3.1.10: Understand the field work of leveling.

3.1.11 Understand the form of field book.

3.1.12 Understand the method of reduction of levels-rise and fall method and height of Collimation method - arithmetic check.

3.1.13 Record the given data in the field book form.

MODULE- IV

4.1.0: Understand the classification of leveling.

4.1.1 Know the types of leveling.

4.1.2 Describe the method of longitudinal sectioning and cross sectioning.

4.1.3 Know the uses of longitudinal section and cross section.

4.2.0: Explain the principle of contouring.

4.2.1 Define contour, contour interval and horizontal equivalent.

4.2.2 List the factors affecting the selection of contour interval.

4.2.3 Know the method of contouring.

4.2.4 Know the types of indirect methods.

4.2.5 Define interpolation of contour.

4.2.6 List the method of interpolation.

4.2.7 List the uses of contour map.

4.2.8 Know the characteristics' of contour line.

4.3.0: Know the errors in leveling.

4.3.1 Know the errors due to curvature and refraction.

4.3.2 Find the correction for curvature and refraction.

4.3.3 Find the distance to visible horizon

4.3.4 Understand steps involved in permanent adjustments of dumpy level

CONTENT DETAILS

MODULE – I

Introduction To Surveying

Concept of surveying – principles of surveying - purpose of surveying - Plane surveying and geodetic surveying. Classification of surveys – based on instruments, based on nature of field – reconnaissance survey .Units of measurements – linear and angular measurements Chain Surveying-purpose and principle of chain survey-equipments used .Different types of chain and tape-selection of stations – base line – check line – tie line. Different operations in chain Surveying- Ranging – different methods-, Chaining and taking offsets, setting out right angles. chaining on sloping grounds. Errors in ordinary chaining (Brief description only).Obstacles in chaining – methods to overcome obstacles, scaling, Plotting, conventional signs. Plane table survey - Purpose and principles of plane table survey-accessories of plane table – description and use-setting up the plane table -radiation, intersection, traversing, and resection.

MODULE – II

Compass survey

purpose and principles of compass survey - types of compass-description and working of prismatic compass - concept of meridian – bearing of a line – True bearing and magnetic bearing. Magnetic dip and declination. Field work in compass survey – booking of field notes. Reduced and whole circle bearings. Calculations of included angles in compass traverse. Sources of errors in compass surveying - local attraction – detection and Correction.(description only) Plotting of compass traverse – closing error and adjustments.

MODULE – III

Levelling

Purpose of levelling - concept of level surface, datum, reduced level and Bench mark. Types of leveling instruments - dumpy, Y, modern tilting and automatic levels. Component parts of leveling instrument – concept of line of collimation, axis of bubble tube, axis of telescope, vertical axis and Sensitiveness of bubble tube. Types of levelling staff. Field work - Temporary adjustments, form of level book. Reduction of levels by rise and fall method and height of collimation method – comparison - problems. Errors in levelling – curvature and refraction corrections, distance to visible horizon – problems.

MODULE – IV

Classification of levelling

Fly levelling, profile levelling, check levelling, reciprocal levelling and contouring. Characteristics of contours – methods of contouring, interpolation of contours - tracing contour gradient – uses of contours- Marking alignments of road, railway and canal in a contour map. Capacity of reservoirs using contour maps. Longitudinal sectioning and cross sectioning – plotting – working profile for roads. Permanent adjustments of dumpy level.

REFERENCE BOOKS

1. B.C.Punmia : Surveying – I ; Laxmi publications
2. T.P.Kanetkar & Kulkarni : Surveying and Levelling ; Jain book depot
3. S.K.Hussain &M.S Nagaraj : Surveying ; S.Chand & Company
4. P.B.Shahai : A textbook of surveying [Vol.I and Vol. II]; Oxford and IBH Publishing Co.
5. A.Bannister, S.Raymond : Surveying ; Pearson
6. Alak de : Plane surveying ; S. Chand and company Ltd.
7. C L Kocher : Text book of Surveying ; Dhanpat Rai Publishing Co (pvt) Ltd