SUBJECT TITLE : SURVEYING –I
(Common for CE, QS, EV, AR)
SUBJECT CODE :
PERIODS/WEEK : 4
PERIODS/SEMESTER : 72
CREDITS : 4

RATIONALE:-

The knowledge of surveying is essential in many phases of engineering. The earliest surveys were made in connection with land surveying. Practically every engineering project such as water supply and irrigation schemes, rail, roads, airways, seaports, transmission lines, mines, bridges and building etc require surveys. Before planning boundaries should be determined and the topography of the site should be ascertained. After the plans are made the structures must be staked out on the ground. As the work progresses, lines and grades must be given. The major fundamental areas of surveying are included in this syllabus to meet the contemporary needs of a technician.

TIME SCHEDULE

Module	Topics	Periods
I	Introduction to surveying	18
	Test-I	1
II	Compass Survey	18
	Test-II	1
III	Levelling	16
	Test-III	1
IV	Classification of leveling	16
	Test-IV	1
Total		**72**

OBJECTIVES

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

Module I

1.1.0 Know the purpose of surveying
1.1.1 State the type of survey used for a given engineering purpose.
1.2.0 Apply the principles of chain survey to make necessary survey plans
1.2.1 List the functions of chain, tape, cross-staff and optical square.
1.2.2 List the operations involved in chain survey to make site plan.
1.2.3 Make a survey plan from given field notes.
1.3.0 Comprehend the principles of plane table survey to fill in details of the field
1.3.1 Explain the principles of plane table survey.
1.3.2 Identify the functions of accessories of plane table.
1.3.3 List the operations to set up and orient the plane table with or without the use of trough compass.
1.3.4 Explain the principles of radiation, intersection traverse and resection.

Module – II

2.1.0 Apply the principle of compass survey in preparing survey plans

2.1.1 Identify the parts and their functions of a prismatic compass.

2.1.2 List the operations involved in the field in collecting the details of a building using compass traverse.

2.1.3 Compute the included angles and true bearings of lines in a compass traverse from given field notes.

2.1.4 Plot the traverse, adjusting for closing error, from given field notes.

2.1.5 List the errors in compass survey.

Module – III

3.1.0 Apply the principle of leveling

3.1.1 Identify the parts and their functions of dumpy level and tilting level.

3.1.2 List the steps involved in performing the temporary adjustments of levelling instruments.

3.1.3 Explain the operations involved for establishing bench marks.

3.1.4 Given a list of observations, record them in field book form.

3.1.5 Compute the reduced levels of stations from field book.

3.1.6 Compute the curvature and refraction corrections from given data.

Module – IV

4.1.0 Apply the principles of Profile leveling and Cross sectioning

4.1.1 Prepare L.S and C.S drawing from field notes.

4.1.2 Mark alignments of roads, canal and railway on contour map.

4.2.0 Apply the principles of contouring

4.2.1Prepare contour plans from given field notes.

4.2.2 Compute the capacity of reservoir from contour map.

4.2.4 List the precautions to minimize errors in leveling.

4.2.5 List the steps involved in performing the permanent adjustments of levelling instruments.

COURSE OUTLINE

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-relative advantage and disadvantages

Module – II

Compass survey-purpose and principles of compass survey-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. 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 leveling - fly levelling, profile levelling, cross sectioning, checks levelling, reciprocal levelling and contouring. Contouring - Characteristics – methods of contouring, plotting by interpolation - tracing contour gradient – uses. 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. Surveying – I – B.C.Punmia
2. Surveying and Levelling – T.P.Kanetkar
3. Surveying _ S.K.Hussain
4. A textbook of surveying – P.B.Shahai [Vol.I and Vol. II (Oxford and IBH Publishing Co.,)]
5. Surveying – A.Bannister, S.Raymond.
6. Plane surveying -- Alak de (S. Chand and company Ltd).