

Ramgarhia Polytechnic College, Phagwara



Civil Engineering Department

Head of Department:	Er. Gurcharan Singh
Name of the Faculty:	Er. Charandeep singh
Discipline:	Civil Engineering Department
Semester:	3rd
Subject:	survey-1
Lesson Plan Duration:	16 Weeks

RATIONALE

The important functions of a diploma civil engineer includes the jobs of detailed surveying, plotting of survey data, preparation of survey maps and setting out works While framing the curriculum for the subject of surveying, stress has been given to the development of the skill in each type of survey like chain surveying, compass surveying leveling, that the Civil Engineering diploma holder will normally be called upon to perform and plane table

surveying, Field work should be a selected one so that student can check his work and have an idea of the results the extent of error in the work done by him. As far as possible, the surveys done should be got plotted, as this will also reveal errors in the work and develop skill in plotting.

Learning Outcomes

CO1.Measure a long line with chain or tape

CO2.Prepare maps for closed traverse and open traverse with survey instruments

CO3.Measure bearing of line

CO4.Perform leveling with digital level

CO5.Find difference of level between two points with dumpy level, auto level and digital level

CO6.Perform temporary adjustments of leveling instruments Map an area by using traversing method

PO 	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 							
CO1							
CO2							
CO3							
CO4							
CO5							
CO6							
CO7							
CO8							
CO9							

Syllabus

Units	Details	Hours
1.	<p>Introduction:</p> <p>1.1 Basic principles of surveying</p> <p>1.2 Concept and purpose of surveying, measurements-linear and angular, units of measurements</p> <p>1.3 Instruments used for taking these measurements, classification based on surveying instruments</p>	(4 hrs)

2.	<p>Chain surveying:</p> <p>2.1 Introduction, advantages and disadvantages</p> <p>2.2 Direct and indirect ranging offsets and recording of field notes</p>	(6 hrs)
3.	<p>Compass surveying:</p> <p>3.1 Purpose of compass surveying. Use of prismatic compass: Setting and taking observations</p> <p>3.2 Concept of following with simple numerical problems:</p> <p>a) Meridian - Magnetic and true</p> <p>b) Bearing - Magnetic, True and Arbitrary</p> <p>c) Whole circle bearing and reduced bearing</p> <p>d) Fore and back bearing</p> <p>e) Magnetic dip and declination</p> <p>3.3 Local attraction - causes, detection, errors and corrections, problems on local attraction, magnetic declination and calculation of included angles in a compass traverse</p>	(8 hrs)
4.	<p>Levelling:</p> <p>4.1 Purpose of levelling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks</p> <p>4.2 Identification of various parts of Dumpy level and use of Dumpy level, Engineer' level, Auto level: advantages and disadvantages, use of auto level.</p> <p>4.3 Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis</p> <p>4.4 Levelling staff: single piece, folding, invar precision staff, telescopic</p> <p>4.5 Temporary adjustment and permanent adjustment of dumpy level by two peg method.</p> <p>4.6 Concept of back sight, foresight, intermediate sight, change point, to determine reduce levels</p>	(15 hrs)

	<p>4.7 Level book and reduction of levels by 4.7.1 Height of collimation method and 4.7.2 Rise and fall method</p> <p>4.8 Arithmetic checks, problem on reduction of levels, fly levelling, check leveling and profile levelling (L-section and X-section), errors in levelling, permissible limits, reciprocal leveling. Numerical problems.</p> <p>4.9 Computations of Areas of regular figures and irregular figures. Simpson's rule: prismatic formula and graphical method use of planimeter for computation of areas, numerical problems</p>	
5.	<p>Plane Table Surveying</p> <p>5.1 Purpose of plane table surveying, equipment used in plane table survey:</p> <p>5.2 Setting of a plane table: (a) Centering (b) Levelling (c) Orientation</p> <p>5.3 Methods of plane table surveying (a) Radiation, (b) Intersection (c) Traversing (d) Resection</p> <p>5.4 Concept of Two point and Three point problems (Concept only)</p> <p>5.5 Errors in plane table survey and precautions to control them. Testing and adjustment of plane table and alidade</p> <p>Hill Roads: 6.1 Introduction: Typical cross-sections showing all details of a typical hill road, partly in cutting and partly in filling 6.2 Special problems of hill areas 6.2.1 Landslides: Causes, prevention and control measures, use of geogrids, geoflexbiles, geo synthetics</p>	(15 hrs)

	6.2.2 Drainage 6.2.3 Soil erosion 6.2.4 Snow: Snow clearance, snow avalanches, frost 6.2.5 Land Subsidence	
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Reference Books:

1. Hussain, SK and Nagraj, MS; "Text Book of Surveying"; New Delhi, S Chand and Co Ltd.
2. Deshpande, RS; "A Text Book Surveying and Levelling"; Poona, United Book Corporation

3. Kochar, CL; "A Text Book of Surveying"; Ludhiana, Katson Publishing House
4. Kanetkar, TP and Kulkarni, SV., "Surveying and Leveling", Poona, AVG Parkashan
5. Mahajan, Sanjay "Surveying -I", Tech. Publication, Delhi
6. Punmia, BC; "Surveying and Leveling", Delhi Standard Publishers Distributors.
7. Shahai, PB; "A Text Book of Surveying", Oxford and IBH Publishing Co.

Delivery/Instructional Methodologies

Sr.No.	Description
1.	Chalk and Talk
2.	PowerPoint Presentation

Assessment Methodologies

Sr. No.	Description	Type
1.	Student Assignment	Direct
2.	Test	Direct
3.	Board Examination	Direct
4.	Student Feedback	Direct

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
	N/A	N/A	N/A

Topics beyond syllabus/advanced topics

Units	Details	Hours
N/A	N/A	N/A

Web Source References

Sr. No.	URL
1.	https://nptel.ac.in/

Lesson Plan

Week	Theory		Practical	
	Lecture Day		Practical Day	
1 st	1 st	Basic principles of surveying	1.	I. Chain surveying: i) a) Ranging a line b) Chaining a line and recording in the field book
	2 nd	Concept and purpose of surveying, measurements-linear and angular, units of measurements		

	3 rd	Instruments used for taking these measurements,		
2 nd	4 th	classification based on surveying instruments	2.	c) Taking offsets - perpendicular and oblique (with a tape only) d) Setting out right angle with a tape
	5 th	Introduction of chain surveying		
	6 th	advantages and disadvantages of chain surveying		
3 rd	7 th	Direct ranging	3.	ii) Chaining of a line involving reciprocal ranging
	8 th	indirect ranging		
	9 th	offsets		
4 th	10 th	Purpose of compass surveying	4.	iii) Chaining a line involving obstacles to ranging
	11 th	Use of prismatic compass:		
	12 th	Setting and taking observations		
5 th	13 th	Bearing - Magnetic, True and Arbitrary Whole circle bearing and reduced bearing	5.	iv) Chain Survey of a small area
	14 th	Fore and back bearing		
	15 th	Magnetic dip and declination		
6 th	16 th	Local attraction - causes, detection, errors and corrections,	6.	Compass Surveying: i) a) Study of prismatic compass
	17 th	problems on local attraction, magnetic declination and calculation of included		

		angles in a compass traverse		b) Setting the compass and taking observations
	18 th	Purpose of levelling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks		
7 th	19 th	Identification of various parts of Dumpy level and use of Dumpy level, Engineer' level, Auto level: advantages and disadvantages, use of auto level.	7.	c) Measuring angles between the lines meeting at a point
	20 th	Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis		
	21 st	Levelling staff: single piece, folding		
8 th	22 ND	folding, invar precision staff, telescopic	8.	Levelling: i) a) Study of dumpy level and levelling staff b) Temporary adjustments of various levels c) Taking staff readings on different stations
	23 RD	Temporary adjustment and permanent adjustment of dumpy level by two peg method		
	24 TH	Temporary adjustment and permanent adjustment of dumpy level by two peg method		

				from the single setting and finding differences of level between them
9 th	25 th	Concept of back sight, foresight, intermediate sight, change point, to determine reduce levels	9.	ii) a) To find out difference of level between two distant points by shifting the instrument
	26 th	Concept of back sight, foresight, intermediate sight, change point, to determine reduce levels		
	27 th	Arithmetic checks, problem on reduction of levels, fly levelling, check leveling and profile levelling (L-section and X-section)		
10 th	28 th	Errors in levelling, permissible limits, reciprocal leveling. Numerical problems	10.	iii) Longitudinal and cross sectioning of a road/railway/canal iv) Setting a gradient by dumpy and auto-level
	29 th	Computations of Areas of regular figures and irregular figures. Simpson's rule: prismatic formula and graphical method use of planimeter for computation of areas		
	30 th	Numerical problems		
11 th	31 ST	Purpose of plane table surveying, equipment		PlaneTableSurveying:

		used in plane table survey:	11	i) a) Study of the plane table survey equipment b) Setting the plane table c) Marking the North direction d) Plotting a few points by radiation method
	32 ND	Setting of a plane table: (a) Centering		
	33 RD	Setting of a plane table: Levelling		
12 th	34 TH	Setting of a plane table: Orientation	12.	ii) a) Orientation by - Trough compass - Back sighting b) Plotting few points by intersection, radiation and resection method
	35 TH	Methods of plane table surveying (a) Radiation,		
	36 TH	Methods of plane table surveying - Intersection		
13 th	37 th	Methods of plane table surveying - Resection	13.	iii) Traversing an area with a plane table (at least five lines)
	38 th	Traversing		
	39 th	Traversing		
14 th	40 th	Concept of Two point problem		V. Layout of Buildings (from given drawing of two room residential

	41 ST	Concept of Three point problem	14.	building) by use of surveying instruments.
	42 ND	Errors in plane table survey and precautions to control them		
15 th	43 RD	Testing and adjustment of plane table and alidade	15.	Revision
	44 TH			
	45 TH			
16 TH	46 TH	Revision	16.	VIVA
	47 TH	Revision		
	48 TH	Revision		

NBA has defined the following seven POs for an Engineering diploma graduate:

- i) **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
- ii) **Problem analysis:** Identify and analyze well-defined engineering problems using codified standard methods.

- iii) **Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
- iv) **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
- v) **Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.
- vi) **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
- vii) **Life-long learning:** Ability to analyze individual needs and engage in updating in the context of technological changes.

Program Specific Outcomes (PSOs)

PSOs are a statement that describes what students are expected to know and be able to do in a specialized area of discipline upon graduation from a program. Program may specify 2-4 program specific outcomes, if required.

These are the statements, which are specific to the particular 11 program. They are beyond POs. Program Curriculum and other activities during the program must help in the achievement of PSOs along with POs.