Lok Jagruti Kendra University
University with a Difference

Diploma in Civil Engineering

LJ Polytechnic

Course Code:025050301

Basic Surveying

Programme / Branch Name			Diploma in Civil Engineering			
Course Name	Basic Surveying				**Course Code**	025050301
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	4	5	50	50	100	200

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ No prerequisites

3. Rationale

Surveying is the first process of starting anyconstruction project and the technique of determining the relative position of different features of a surface of the earth. The planning and design of all civil engineering projects such as the construction of highways, bridges, tunnels, dams, etc are based upon surveying measurements. Moreover, during execution, a project of any magnitude is constructed along the lines and points established by surveying. Thus, surveying is a basic requirement for all civil engineering projects. The subject involves the different methods of linear measurements, angular measurements and plotting of the topography of the ground. This course will help the students to get familiar with the various surveying instruments and will help improve the understanding of the topography of building sites. This course will provide an opportunity to develop skills of surveying at the primary level and help in a better understanding of the other subjects of this course in later stages.

4. Objectives

- ✓ To gain knowledge of surveyingequipment and understand their relevant uses.
- ✓ To prepare a topographic map of the land surface.
- ✓ To plot the traverse with linear and angular measurements of any earth's surface.
- ✓ To understand the process of profile levelling.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1.	**Fundamental Definitions and Concepts**	1.1. Importance of Basic Surveying 1.2.Surveying: Object 1.3. Primary Divisions of Survey 1.4. Classification of Survey 1.5. Principles of Surveying 1.6. Plans and Maps 1.7. Scales 1.8. Plain Scale 1.9. Diagonal Scale 1.10. Errors Due to Use of Wrong Scale	• Understand the Concept of Basic Surveying. • Classify Various Surveys. • Explain Types of Scales.	15	5
2.	**Linear Measurements**	2.1. General 2.2. Different Methods of Linear Measurements 2.3. Direct Measurements 2.4. Instruments for Chaining 2.5. Ranging Out Survey Lines 2.6. Chaining on Sloping Ground 2.7. Locating Ground Features: Offsets 2.8. Area from Offsets to a Baseline: Offsets at Regular Intervals 2.9. Area by Planimeter 2.10. Instruments for Setting Out Right Angles 2.11. Obstacles in Chaining 2.12. Errors in Chaining 2.13. Field Book 2.14. Errors Due to Incorrect Chain	• Understand the Various Tools Used for Linear Measurements. • Explain the Procedure of Linear Measurements. • Knowledge about Field Book.	20	7

3.	**The Compass**	3.1. Introduction 3.2. Bearings and Angles 3.3. The Theory of Magnetic Compass 3.4. The Prismatic Compass 3.5. The Surveyor's Compass 3.6. Magnetic Declination 3.7. Local Attraction 3.8. Errors in Compass Survey	• Knowledge about Bearings and Angles. • Explain the Procedure for Angular Measurement. • Understand the Working Operation of Compass. • Understand the Errors in Compass Survey.	25	10
4.	**Plane Table Surveying**	4.1. General: Accessories 4.2. Working Operations 4.3. Methods of Plane Tabling 4.4. Advantages and Disadvantages of Plane Tabling 4.5. Errors in Plane Tabling	• Knowledge about Accessories Used for Plane Table Surveying. • Understand the Working Operation of Plane Table Surveying. • Understand the Errors in Plane Table Survey.	15	5
5.	**Levelling and Contouring**	5.1. Levelling 5.1.1. Definitions 5.1.2. Methods of Levelling 5.1.3. Levelling Instruments 5.1.4. Temporary Adjustments of a Level 5.1.5. Booking and Reducing Levels 5.1.6. Balancing Backsights and Foresights 5.1.7. Curvature and Refraction 5.1.8. Errors in Levelling	• Understand the Types of Equipment Used for Levelling. • Explain Methods and Their Procedure for Levelling. • Understand the Errors that Occur in Levelling.	25	15
		5.2. Contouring 5.2.1. General 5.2.2. Contour Interval 5.2.3. Characteristics of Contours 5.2.4. Methods of Locating Contours 5.2.5. Interpolation of Contours 5.2.6. Contour Gradient 5.2.7. Use of Contour Maps	• Understand the Uses of Contour Survey. • Understand Methods of Locating Contours.		
				Total Hours	**42**

6. List of Practicals / Exercises

The practicals/exercises have been properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/programme outcomes. Following is the list of practicals/exercises.

Sr. No.	Practical / Exercises	Key Competency	Hours
1.	To carry out linear measurements by ranging and chaining with and without any obstructions.	Linear Measurements	8
2.	To carry out perpendicular offsets and oblique offsetsconcerning the above linear measurements survey.	Plotting of Offsets	2
3.	To plot a right angle on-field by using cross-staff.	Plotting of Right Angles	2
4.	To determine bearings of different survey lines by using a prismatic compass.	Knowledge of Bearings	4
5.	To calculate the included angles from the above-measured bearings.	Calculation of Included Angles	2
6.	Tosurvey by using chain, tape and compass for any given field area and prepare in drawing sheet. (A2 size sheet)	Plotting of Traverse with Linear Measurements	10
7.	Demonstrate the plane table by using different orientation methods.	Working Operations of Plane Table	4
8.	To carry out plane table survey by using radiation method and prepare drawing sheet. (A2 size sheet)	Plane Table Survey	6
9.	To perform temporary adjustments of dumpy level.	Working Operations of Dumpy Level	4
10.	To determine to reduce level using H.I. method and Rise & Fall method.	Calculation of R.L.	2
11.	To carry out profile levelling on different field conditions.	Plotting of Contour	4
12.	To carry out profile levelling on the undulated ground and prepare the drawing sheet. (A2 size sheet)	Plotting of Contour	8
		Total Hours	**56**

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1.	Fundamental Definitions and Concepts	25	20	20	15	0	20
2.	Linear Measurements	20	35	20	0	0	25
3.	The Compass	30	30	15	5	0	20
4.	Plane Table Surveying	30	30	20	10	0	10
5.	Levelling and Contouring	20	40	30	5	0	5

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Textbook

1) Surveying Vol-I by B.C. Punmia, Laxmi Publications Pvt.Ltd.

9. Reference Books

1) Surveying and Levelling by R.Subramanian, Oxford University Press.
2) Surveying Vol-I by S.K.Duggal, Tata McGraw Hill.
3) Surveying and Levelling Vol-I by T. P. Kanetkar & S.V. Kulkarni, Puna Vidyarthi GrihaPrakashan.
4) Surveying and Levelling Vol-I by Hussain & Nagrani, S.Chand New Delhi.

10. Open Sources (Website, Video, Movie)

1) www.nptel.ac.in
2) LJP-Civil-Surveying (YouTube)