SURVEYING

ENCE 261

Lecture : 2 **Year : II**
Tutorial : 0 **Part : II**
Practical : 4

Course Objectives:
The objective of this course is to provide basic knowledge of land measurement and surveying techniques, and make the students to learn and understand the theory and field procedures by applying suitable surveying methods.

1 Introduction (2 hours)

1.1 Historical background of surveying
1.2 Principle of surveying
1.3 Plane and geodetic surveying
1.4 Scales and types of scales

2 Linear Measurement and Offset (4 hours)

2.1 Units for distance and significant figures
2.2 Distance measurements technique and equipment
2.3 Accuracy, precision, error, sources of error, types of error
2.4 Distance measurements in fairly level and sloping ground
2.5 Principle of EDM and its application in distance measurements
2.6 Principle of chain survey and types of offsets

3 Compass Surveying (4 hours)

3.1 Introduction, definition of meridian, bearing and azimuth
3.2 Types of bearing, conversion from one system to another
3.3 Calculation of angles from bearings and vice versa
3.4 Local attraction
3.5 Compass traverse and plotting
3.6 Graphical adjustment of errors

4 Leveling (7 hours)

4.1 Basic definition and importance of leveling
4.2 Principle and methods of leveling
4.3 Temporary and permanent adjustment of level, two peg test
4.4 Booking and calculation of reduced level

4.5 Classification of leveling: Fly leveling, profile leveling, cross sectioning and precise leveling
4.6 Adjustment of level circuits
4.7 Sources of errors in leveling

5 Contouring (3 hours)

5.1 Introduction, contour interval and horizontal equivalent
5.2 Factors affecting contour interval; Characteristics of contour interval
5.3 Methods of locating contours
5.4 Methods for interpolation of contours
5.5 Uses of contour maps
5.6 Computation of area: Trapezoidal and Simpson's 1/3 rules

6 Theodolite, Total station and Traversing (7 hours)

6.1 Basic definition of theodolite and total station
6.2 Construction principle and parts of theodolite and total station
6.3 Temporary adjustment of theodolite and total station
6.4 Measurements of horizontal angles, vertical angles and distances
6.5 Needs and significance of traversing
6.6 Field works for traversing and field notes
6.7 Computation of major traverse

7 Layout of Buildings (3 hours)

7.1 Setting out small buildings using chain and tape
7.2 Setting out large buildings using theodolite and tape
7.3 Setting out vertical control: Tall buildings from foundation to floor levels

Assignments

1. Tutorials provided in respective chapters
2. Exercise for map production in each chapter if applicable

Practical (60 hours)

1. Pacing, horizontal distance measurement in fairly level and sloping ground
2. Compass traversing and detailing by compass and offset methods
3. Two peg test
4. Fly leveling: Transfer reduced level from temporary bench mark (TBM) to TBM
5. Longitudinal leveling and cross sectional leveling
6. Theodolite and total station handling and measuring the angle by directional method
7. Total station traversing and calculation of Gale’s table
8. Minimum three room building setting out by linear and angular method

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapter	Hours	Marks distribution*
1	2	2
2	4	4
3	4	4
4	7	8
5	3	3
6	7	6
7	3	3
Total	**30**	**30**

* There may be minor deviation in marks distribution.

References

1. Punmia B.C., Jain A.Kr., Jain A.K. (2005); SURVEYING VOL. I; VOL II & VOL III; Laxmi publication.
2. Basak N.N. (2004), Surveying and Levelling; Tata McGraw-Hill Education Pvt. Ltd.
3. Agor R. (1980); A Text Book of Surveying and Levelling; khanna publisher India
4. Duggal S. K.(2013); Surveying: Volume 1 & 2; Tata McGraw - Hill Education
5. Dhakal B. B.; Karki B. K. (2019); Engineering surveying I & II; Second edition; Heritage publication and distributors
6. Basnet N.; Basnet M. (2011); Basic Surveying I & II; National Book Center