

SHIV NADAR UNIVERSITY
UNDERGRADUATE COURSE

- I. **Course Title:** Elements of Surveying
- II. **Course Code:** CED 206
- III. **Course Credits (L:T:P):** 4 (3:0:1)
- IV. **Course Type:** Major; UWE
- V. **Prerequisite/s (If Any):** Not Required
- VI. **Course Coordinators/Instructor(s):** Dr. Shalini rankavat
- VII. **School:** School of Engineering
- VIII. **Department:** Civil Engineering
- IX. **Objective:** The objective of the course is to describe surveying which deals with measuring linear distances and angles (horizontal and vertical) on the ground, so that they can be accurately plotted on a map. Surveys are required prior to and during the planning and construction of buildings, dams, highways, railways, bridges, canals, tunnels, drainage works, water supply and sewerage systems, etc. This course enables students to understand various theoretical and practical aspects on viz. chain, compass, plane table, leveling and contouring, Area and volume calculation, Theodolite, and Electronic devices in Surveying.
- X. **Learning Outcomes:** Upon successful completion of the course, student should be able to
- use latest instruments like EDM, total station, GPS etc.
 - employ appropriate survey methods in land survey, construction projects and to generate maps

XI. **Course Content:**

Chapter 1: Overviews and Introduction (Basics of Surveying): Overview of elements of surveying; brief ideas of technical terminologies and survey equipment; Fundamental concepts; Classification of surveys; Plane surveying, Geodetic surveying; Principles and operations of surveying; Surveying measurements; Mapping and conventional signs.

Chapter 2: Linear Measurement (Chain and Tape Surveying): Chain survey; Instruments (chains, tapes, ranging rods, etc.); Errors in chain surveying and their elimination; Uses of cross staff and optical square; Offsets; Obstacles in chaining.

Chapter 3: Compass Surveying: Prismatic compass; Surveyor's compass; Bearing: whole circle (W.C.B) and reduced bearing (R.B); Local attraction and its adjustments; Traversing; Errors in compass surveying and precautions.

Chapter 4: Plane Table Surveying: Plane Table Instruments and Accessories; Merits and demerits; Methods (Radiation, Intersection, Resection, and Traversing); Orientation; Two and three point problems; Errors in plane tabling.

Chapter 5: Theodolite Surveying: Study of theodolite, Temporary and permanent adjustments; Measurement of horizontal angles (repetition and reiteration methods); Measurement of vertical angles; Sources of errors; Overview on Optical and Electronic theodolites.

Chapter 6: Traverse Surveying: Traverse Surveying; Tacheometric surveying; Stadia method, Movable hair method; Trigonometric leveling and various methods.

Chapter 7: Levelling: Principle and definition; Levelling instruments; Dumpy level; Auto and Digital level; Booking and reducing levels (Collimation, Rise and Fall); Curvature and refraction corrections; Bubble tube and its sensitiveness; Difficulties in Levelling.

Chapter 8: Contouring: Contour survey; Definition, Characteristics of contours; Methods of contouring; Interpolations; Uses of contour maps.

Chapter 9: Area and Volume Surveying: Areas and Volume computation; Trapezoidal rule; Simpson's rule; Other relevant methods for area and volume computation.

Chapter 10: EDM, and Minor instrumentation: Introduction to Electro-Magnetic Distance Measurement (EDM); EDM basic functions; Types of EDM instruments; Total Station Surveys. Minor Instruments: Box sextant; Planimeter; Pantagraph; Clinometer

XII. RECOMMENDED BOOK(S):

TEXT BOOKS

1. Bannister, A., 2006/2011. Surveying. Pearson Education India.
2. Punmia, B.C., Jain, A.K. and Jain, A.K., 2005. Surveying, Vols. I II and III. Laxmi Publication.
3. Kanetkar T.P., "Surveying and Levelling", Vols. I and II, United Book Corporation, Pune (1994)

REFERENCE BOOKS

1. Duggal, S. K. "Surveying" Vol 1, Tata, McGraw Hill (2004)
2. Roy, S.K. Fundamentals of Surveying, PHI.
3. K. R., Arora. "Surveying" Vol I and II, Standard Book House (1993)

XII. Assessment Scheme:

Quiz	10
Attendance and Class performance/Assignments	15
Mid-sem exam	20
End-sem exam	30
Lab	25
<u>Total</u>	<u>100</u>

Laboratory

Lab record	7
Class performance and field work	8
End-sem exam	10
<u>Total</u>	<u>25</u>