

Course Type	Course Code	Name of Course	L	T	P	Credit
DSC4	NCEC104	Surveying Laboratory	0	0	2	1

Course Objective
This course deals with basic and advanced surveying instruments, skills to use total Station for traversing an area, set out curves and to provide basic knowledge on GPS surveying and making map from field data.
Learning Outcomes
On successful completion of this course, student will be able to: <ul style="list-style-type: none"> <li>• Use and operate chain, tape, compass and theodolite in the field.</li> <li>• Use total station in the field for various applications of civil engineering and setting out of curve.</li> <li>• Understand the basic principles of GPS and map making</li> </ul>

Unit No.	Topics to be covered	Lecture Hours	Learning Outcome
1	Measurement of distance and chaining across obstacles: chain and tape surveying.	1	To know how to use chain and tape for horizontal measurement
2	Measurement of bearings of sides of traverse using Prismatic compass and computation of included angle.	1	To understand the use of compass for bearing measurement.
3	Measurement of horizontal angle with theodolite.	1	Understanding the concept of measurement of horizontal angle by theodolite.
4	Measurement of vertical angles and finding the height of an object using theodolite.	1	Understanding the concept of measurement of vertical angle by theodolite.
5	Traverse surveying using theodolite.	1	Understanding the concept of traverse of an area by theodolite
6	Demonstration of various levelling instruments and differential/ fly levelling by Height of Instrument Method.	1	To get knowledge on vertical measurement instruments and their methods.
7.	Differential / fly levelling by Rise and Fall method.	1	Understand the concept of differential / fly levelling with advanced levelling instruments.
8.	Demonstration of total station: Measurement of distance, angle between two stations.	1	Introduction to total station and working principle of total station for distance and angular measurement.
9	Traversing with total station.	1	Get practical knowledge on traversing with total station.
10	Setting out simple curve by Rankine's method using total station.	1	To understand how to establish curves in the field.

11	Study of GPS and field data collection using GPS.	1	Knowledge on GPS and methods to collect GPS data in field.
12	Preparation of map using total station and GPS filed survey data.	1	Knowledge on various open source software for plotting maps using GPS field data.
13	Study of Digital Level and traversing with Digital Level	1	Knowledge about the digital level, an advanced equipment used nowadays for surveying.
14	Evaluation	1	Evaluating the understanding of the course by the students.

**Text Books / References:**

1. Manual for Surveying Laboratory.