

BCE-405	Surveying and Geomatics	2L:1T:0P	3 credits
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Pre-requisite: Basic geometry & trigonometry

Course Objectives:

CO1	Describe the function of surveying in civil engineering construction
CO2	Identify the sources of measurement errors and mistakes; understand the difference between accuracy and precision.
CO3	Operate a total station to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system,
CO4	Perform traverse calculations; determine latitudes, departures, and coordinates of control points and balancing errors in a traverse.

Module 1:

Introduction to Surveying: Principles, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines, Levelling, Plane table surveying, Principles of levelling- booking and reducing levels; differential, reciprocal leveling, profile levelling and cross sectioning. Auto Level, Errors in leveling, contouring: Characteristics, methods, uses; areas and volumes. Numerical on Chain surveying, compass surveying and levelling.
Theodolite survey: Instruments, Measurement of horizontal and vertical angle.

Module 2:

Curves: Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves.

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Types of EDM instruments, Total Station – Parts of a Total Station – Accessories –Advantages and Applications. Introduction of aerial photographs. Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS.

Module 3:

Plane table surveying: Principles, Accessories of Plane table, orientation, Procedure of setting up Plane table over a station, Methods of plane tabling, Procedure of Plane table traversing & advantages and disadvantages of Plane table surveying.

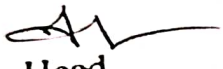
Remote Sensing: Introduction – Remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

Course Outcomes: After the completion of this course the students will be able to:


CO1	Describe the basic principles of surveying.
CO2	Conduct a survey for a given area and minimize the error by applying suitable corrections.
CO3	Measure the distance, vertical and horizontal angles using advanced surveying instruments.
CO4	Relate the knowledge on Surveying to the new frontiers of science like Hydrographic surveying, Global Positioning System, Photogrammetry and Remote Sensing.

Text/Reference Books:

- 1 Madhu, N, Sathikumar, R and Satheesh Gobi, *Advanced Surveying: Total Station, GIS and Remote Sensing*, Pearson India, 2006.
- 2 Manoj, K. Arora and Badjatin, *Geomatics Engineering*, Nem Chand & Bros, 2011
- 3 Bhavikatti, S.S., *Surveying and Levelling, Vol. I and II*, I.K. International, 2010
- 4 Chandra, A.M., *Higher Surveying, Third Edition*, New Age International (P) Limited, 2002.
- 5 Anji Reddy, M., *Remote sensing and Geographical information system*, B.S Publications, 2001.
- 6 Arora, K.R., *Surveying, Vol-I, II and III*, Standard Book House, 2015.



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