

B. E. CIVIL ENGINEERING Choice Based Credit System (CBCS) and Outcome Based Education (OBE) SEMESTER - IV			
ADVANCED SURVEYING			
Course Code	18CV45	CIE Marks	40
Teaching Hours/Week(L:T:P)	(3:0:0)	SEE Marks	60
Credits	03	Exam Hours	03
Objectives: This course will enable students to 1. Apply geometric principles to arrive at solutions to surveying problems. 2. Analyze spatial data using appropriate computational and analytical techniques. 3. Design proper types of curves for deviating type of alignments. 4. Use the concepts of advanced data capturing methods necessary for engineering practice			
Module-1			
Theodolite Survey and Instrument Adjustment: Theodolite and types, Fundamental axes and parts of Transit theodolite, uses of theodolite, Temporary adjustments of transit theodolite, measurement of horizontal and vertical angles, step by step procedure for obtaining permanent adjustment of Transit theodolite. Trigonometric Levelling: Trigonometric leveling (heights and distances-single plane and double plane methods).			
Module-2			
Tacheometry: Basic principle, types of tacheometry, distance equation for horizontal and inclined line of sight in fixed hair method, problems. Geodetic Surveying: Principle and Classification of triangulation system, Selection of base line and stations, Orders of triangulation, Triangulation figures, Reduction to Centre, Selection and marking of stations.			
Module-3			
Curve Surveying: Curves – Necessity – Types, Simple curves, Elements , Designation of curves, Setting out simple curves by linear methods (numerical problems on offsets from long chord & chord produced method), Setting out curves by Rankines deflection angle method (Numerical problems). Compound curves, Elements, Design of compound curves, Setting out of compound curves (numerical problems). Reverse curve between two Parallel straights (numerical problems on Equal radius and unequal radius). Transition curves Characteristics, numerical problems on Length of Transition curve, Vertical curves & Types – (theory).			
Module-4			
Aerial Photogrammetry Introduction, Uses, Aerial photographs, Definitions, Scale of vertical and tilted photograph (simple problem Ground Co-ordinates (simple problems), Relief Displacements (Derivation), Ground control, Procedure of aerial survey, overlaps and mosaics, Stereoscopes, Derivation Parallax.			
Module-5			
Modern Surveying Instruments Introduction, Electromagnetic spectrum, Electromagnetic distance measurement, Total station, Lidar scanners for topographical survey. Remote Sensing: Introduction, Principles of energy interaction in atmosphere and earth surface features, Image interpretation techniques, visual interpretation. Digital image processing, Global Positioning system Geographical Information System: Definition of GIS, Key Components of GIS, Functions of GIS, Spatial data, spatial information system Geospatial analysis, Integration of Remote sensing and GIS and Applications in Civil Engineering(transportation, town planning).			

Course outcomes: After a successful completion of the course, the student will be able to:

1. Apply the knowledge of geometric principles to arrive at surveying problems
2. Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
3. Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
4. Design and implement the different types of curves for deviating type of alignments.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Textbooks:

1. B.C. Punmia, "Surveying Vol.2", Laxmi Publications pvt. Ltd., New Delhi.
2. Kanetkar T P and S V Kulkarni , Surveying and Leveling Part 2, Pune Vidyarthi Griha Prakashan,
3. K.R. Arora, "Surveying Vol. 1" Standard Book House, New Delhi.
4. SateeshGopi, Global Positioning System, Tata McGraw Hill Publishing Co. Ltd. New Delhi.

Reference Books:

1. S.K. Duggal, "Surveying Vol. I & II", Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi.
3. David Clerk, Plane and Geodetic Surveying Vol1 and Vol2, CBSpublishers
4. B Bhatia, Remote Sensing and GIS, Oxford University Press, New Delhi.
5. T.M Lillesand, R.W Kiefer,. and J.W Chipman, Remote sensing and Image interpretation , 5th edition, John Wiley and SonsIndia
6. James M Anderson and Adward M Mikhail, Surveying theory and practice, 7th Edition, Tata McGraw HillPublication.
7. Kang-tsung Chang, Introduction to geographic information systems, McGraw Hill HigherEducation.


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