

Branch Name:	CIVIL ENGINEERING
Program Code:	ET 106
Course Title:	Advance Surveying
Course Code:	2ET1060302T
Pre-requisite Course:	Elementary course on surveying

Course Objectives:

- CO-1: To develop concepts of various types of land surveying, prepare and interpret maps and drawings.
CO-2: To understand measurement techniques to know the ground topography and use of the modern survey equipments.
CO-3: To learn procedure for elevation calculation and contour plotting.
CO-4: To recognize the usefulness of calculating area and volume in construction work and also learn to use surveying in various construction projects.
CO-5: Explain the fundamentals of drone surveying and methods of surveying using with drone.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Course Contents:

Unit No	Topic	Total Hours	Weight age (%)
1	Plane table survey: Equipment's, working operations, different methods, advantages and disadvantages, Two point and Three point problems	3	10
2	Theodolite Traversing: Theodolite, temporary and permanent adjustments, measurement of horizontal and vertical angles, elimination of errors, Traversing: Uses and method of traversing, traversing procedure, check in closed and open traverse. Tacheometric Surveying: Introduction, purpose, principle, instruments, stadia constants, methods of tacheometry, anallatic lens, subtense bar, field work in tacheometry.	8	25
3	Geodetic Surveying- Principle and Classification of triangulation system- Selection of base line and stations- Triangulation figures- Station marks and signals marking signals- election and marking of stations.	5	10
4	Curves: Introduction, theory and setting out methods of simple circular curve, elements of a compound and reverse curves, transition curve, types of transition curve, combined curve, types of vertical curves.	6	10
5	Computation of Areas: Methods to compute area of traverse- Determining areas from Plans, Trapezoidal rule- Simpson's rule, Use of planimeter Computation of Volumes- Volume from cross sections, Trapezoidal and Prismoidal formulae, Prismoidal correction, Curvature correction.	5	15

6	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.	7	10
7	Miscellaneous: Modern Surveying Instruments: Introduction, Electromagnetic spectrum, Electromagnetic distance measurement, Total station, Digital self-leveling levels, scanners for topographical survey. Hydrography: Introduction, purposes, control points, soundings, instruments & methods of locating soundings. Setting out Works: Building, Culvert, Bridge, Tunnel. Land survey and record: Land Record documents, Land revenue, main source of revenue, Indian rules, Digitization. Drone Surveying: Introduction to drones, history of drone, consideration for hardware selections, comparison on surveying drone and its accuracy, techniques of controlling errors, applications.	8	20

Reference Books:

1. Surveying Vol. I, II and III by Dr. B.C. Punamia, Laxmi Publishers. New Delhi
2. Advanced Surveying by R. Agor, Khanna Publishers, New Delhi
3. Lillesand and Kiefer, "Remote Sensing and Image Interpretation", 5th Edition, published by John Wiley and Sons, 2008.
4. One Nation Under Drones: Legality, Morality, and Utility of Unmanned Combat Systems by John E. Jackson.
5. A.M. Chandra, S.K. Ghosh, "Remote Sensing and Geographical Information System", Narosa Publishing house, 1st Edition, 2007.
6. David P Paine, "Aerial Photography and Image Interpretation", 2nd Edition, published by Wiley, Higher Education, 2006.
7. Drones and Support for the Use of Force by James Igoe Walsh.

Course Learning Outcomes (CLO):

1. Conduct plane table and theodolite traverse surveys at identified Site.
2. Conduct tacheometry and geodetic survey.
3. Set out simple circular and transition curves at given location.
4. Compute areas and volumes using standard rules and equipment's such as planimeter.
5. Apply GIS in solving engineering problems.
6. Utilize total station and other modern survey instruments.
7. Conduct hydrographical survey.
8. Give layout of foundations for buildings, culverts, bridges and tunnels as per plan/drawing.
9. Learn the components in Drone.

Project:

Term work shall be based on the following field projects conducted by students:

- 1) Theodolite traverse survey project.
- 2) Students shall perform the tachometry survey project at the hilly region.
- 3) Setting out of curve.
- 4) Drone Survey.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Conduct plane table and theodolite traverse surveys at identified Site.	L6
CLO2	Conduct tacheometry and geodetic survey.	L6
CLO3	Set out simple circular and transition curves at given location.	L2
CLO4	Compute areas and volumes using standard rules and equipment's such as planimeter.	L4, L5
CLO5	Apply GIS in solving engineering problems.	L3
CLO6	Utilize total station and other modern survey instruments.	L3
CLO7	Conduct hydrographical survey.	L6
CLO8	Give layout of foundations for buildings, culverts, bridges and tunnels as per plan/drawing.	L4
CLO9	Learn the components in Drone.	L2

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create
Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CLO1	H	M	M		L								M	M	M
CLO2	H	M	M		L								M	M	M
CLO3	H	M	M										M	M	M
CLO4	H	M	M		L								M	M	M
CLO5	H	M	M	M	H								M	M	M
CLO6	H	M	M	M	H							M	M	M	M
CLO7	H	M	M	M	L								M	M	M
CLO8	M	M	M	M									M	M	M
CLO9	M	M	M	M	H							M	M	M	M

H: High, M: Medium, L: L