GOVERNMENT POLYTECHNIC, BOLANGIR
DEPARTMENT OF CIVIL ENGINEERING

Discipline: CIVIL ENGG.	**Semester: 5TH**	**Name of the Teaching Faculty: - Guest Faculty [Civil Engg.]** 1
Subject: TH:1-SURVEYING	**No. of days/week class allotted: 03**	**Total contact Hours-45Hrs** **Total Marks-100** **Assessment: Internal Assessment -30, End term-70**
COURSE OUTCOMES	**CO1: Select the appropriate type of survey required for a given situation and apply the principles of surveying.** **CO2: Compute area of open fields using chain, tape, cross staff and digital planimeter.** **CO3: Conduct traversing in the field using chain, compass and theodolite and prepare plans.** **CO4: Use levelling instruments to determine reduced levels and prepare contour maps.** **CO5: Find distances and elevations using tacheometer and prepare plans using Total Station.** **CO6: Locate coordinates of stations using GPS and explain the applications of Remote Sensing, GIS and Drone Surveying.**	

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	CO
1	Introduction to Surveying	Purpose, scope and uses of surveying	Survey maps, field photographs	CO1
2	Classification of Surveying	Primary and secondary surveys	Charts and survey examples	CO1
3	Types of Surveying	Plane, geodetic, cadastral, hydrographic, aerial and photogrammetry surveys	Case studies and maps	CO1
4	Principles of Surveying	Working principles and applications	Demonstration using field examples	CO1
5	Scales in Surveying	Engineer's scale, RF and diagonal scale	Scale models and numerical examples	CO1
6	Chain Survey Instruments	Metric chain, tapes, arrows and ranging rods	Actual instruments demonstration	CO2

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	CO
7	Chain Survey Instruments	Line ranger, offset rod, cross staff and optical square	Instrument handling activity	CO2
8	Survey Stations and Lines	Base line, check line, tie line and offsets	Field sketches	CO2
9	Ranging	Direct and indirect ranging	Outdoor field demonstration	CO2
10	Chaining Methods	Procedures and obstacles in chaining	Field practice illustrations	CO2
11	Errors in Chaining	Instrumental, personal and natural errors	Numerical examples and discussion	CO2
12	Offsets and Conventional Signs	Perpendicular and oblique offsets	Survey drawing activity	CO2
13	Field Book Recording	Booking and plotting procedures	Sample field books	CO2
14	Area Computation by Chain Survey	Computation of field area	Numerical examples	CO2
15	Introduction to Compass Survey	Purpose and applications	Compass instruments	CO3
16	Compass Traversing	Open and closed traverses	Traverse sketches	CO3
17	Bearings and Meridians	True and magnetic meridians, bearings	Numerical examples	CO3
18	WCB and RB Systems	Conversion between bearing systems	Tutorial exercises	CO3
19	Fore Bearing and Back Bearing	Computation and checks	Numerical examples	CO3
20	Magnetic Declination and Dip	Concepts and applications	Charts and examples	CO3

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	CO
21	Prismatic and Surveyor Compass	Components and functions	Instrument demonstration	CO3
22	Temporary Adjustments of Compass	Procedure and observations	Field activity	CO3
23	Local Attraction	Detection and correction	Numerical examples	CO3
24	Traverse Plotting	Methods and closing error	Drawing sheets and examples	CO3
25	Adjustment of Traverse	Graphical adjustment of closing error	Practical exercises	CO3
26	Introduction to Levelling	Terminologies and concepts	Level instrument demonstration	CO4
27	Bench Marks and Reduced Levels	Types of BM and RL calculations	Numerical examples	CO4
28	Types of Levels	Dumpy, tilting, auto and digital levels	Actual instruments	CO4
29	Level Staff and Adjustments	Staff types and temporary adjustments	Field demonstration	CO4
30	Reduction of Levels	Height of collimation method	Numerical problems	CO4
31	Reduction of Levels	Rise and fall method	Numerical problems	CO4
32	Types of Levelling	Simple, differential, fly, profile and reciprocal levelling	Field examples	CO4
33	Contouring	Contours, contour interval and characteristics	Contour maps	CO4
34	Methods of Contouring	Direct and indirect methods	Contour map exercises	CO4
35	Digital Planimeter	Components and use	Instrument	CO2

Class Day	Main Topic	Sub-Topics	Teaching Aids / Activities	CO
			demonstration	
36	Area and Volume Measurement	Area by planimeter and volume from contour maps	Numerical examples	CO2
37	Introduction to Theodolite	Types, uses and components	Theodolite demonstration	CO3
38	Temporary Adjustments of Theodolite	Fundamental axes and adjustments	Instrument handling activity	CO3
39	Measurement of Angles	Horizontal and vertical angles	Field observations	CO3
40	Theodolite Traversing	Included angle and deflection angle methods	Traverse exercises	CO3
41	Traverse Computation	Latitude, departure and balancing	Numerical examples	CO3
42	Tacheometric Surveying	Principles, constants and distance measurement	Tacheometer demonstration	CO5
43	Curve Setting	Simple circular curve by offsets and Rankine's method	Numerical examples and sketches	CO5
44	Advanced Survey Equipment	EDM, Digital Theodolite and Total Station	Instrument demonstration and field data	CO5
45	GPS, GIS, Remote Sensing and Drone Surveying	GPS, DGPS, GIS applications, Remote Sensing and Drone Surveying	Satellite imagery, GIS maps, drone survey case studies	CO6

LEARNING RESOURCES

1. Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain, Surveying Vol-I & Vol-II.
2. Kanetkar, T.P. and Kulkarni, S.V., Surveying and Levelling.
3. Duggal, S.K., Surveying Vol-I & Vol-II.
4. Arora, K.R., Surveying and Geomatics.
5. Basak, N.N., Surveying and Levelling.
6. IS Codes related to Surveying Practices.
7. Total Station, GPS and Digital Survey Equipment Manuals.

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