BVM ENGINEERING COLLEGE [AN AUTONOMOUS INSTITUTION]

2CE02: ENGINEERING SURVEYING
CREDITS - 4 (LTP:3,0,1)

Course Objectives:

1. Understand conventional and modern methods of surveying.
2. Develop ability to transform basic concept of surveying to field practice.
3. Interpret plans and maps for planning and setting out works.
4. Understand modern surveying techniques for mapping.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
				Theory		Practical		
L	T	P	C	ESE	CE	ESE	CE	
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Basics of Measurement & Mapping** **Linear Measurement:** Linear measurement in horizontal plane; measurement of distance, chainage, offset and linear measurement in vertical plane; levelling. (Recap) **Angular Measurement:** Angular measurement in horizontal plane**;** bearings (Recap), angles of triangle or traverse and angular measurement in vertical plane; angles w.r.t. horizontal axis or zenith. **Mapping:** Concept of projection system and spheroid (mathematical and physical). Understanding coordinates: Geographic coordinate (Latitude, Longitude, and Altitude) and planimetric coordinate (X, Y, Z or N, E, Z).	5
2	**Surveying using Conventional Instruments** Theodolite Survey: Introduction, the vernier transit theodolite, measuring horizontal and vertical angles, methods of traversing, closing error, computation of latitudes and departure, check in closed and open traverse, balancing of traverse, Gale's table, omitted measurements. Tacheometric survey: Introduction, purpose, principle, instruments, stadia constants, methods, field work, errors and precisions. Trigonometric levelling: Indirect levelling, leveling on steep ground-methods, base of the objects accessible and inaccessible. Plane table Surveying: Principle, instrument, Method and sources of error.	10
3	**Surveying using Modern Instruments** **EDM:** EDM Techniques and instruments. **Digital Level**: Introduction, functional elements and leveling using digital level. **Digital Theodolite**: Functional elements and angle measurement using digital theodolite. **Total Station**: Functional elements, types of TS, Working with TS.	7

Unit No.	Topics	Teaching Hours
4	**Modern Techniques in Surveying & Mapping**: **Digital Photogrammetry:** Introduction, types of photogrammetry, surveying using aerial photogrammetry. **Remote Sensing**: Introduction, types of remote sensing, remote sensing development in India, Applications of remote sensing in Civil engineering. **Geographical Information System (GIS):** Introduction, datasets and data structures, GIS applications. **Global Navigation Satellite System (GNSS):** Introduction to GPS, GLONASS, Galileo, COMPASS and GAGAN. GPS Segments, Positioning techniques, GNSS application.	**13**
5	**Applications of Surveying:** **Setting Out of Curves:** Setting out of Curves: Introduction, types, setting out methods of simple circular curve, elements of compound and reverse curves, transition curve, types of transition curve, combined curve, types of vertical curves. **Computation of Areas & Volume:** Computation of Area: Methods to compute area of traverse- area from cross sections, Trapezoidal rule- Simpson's rule, Methods to compute area from plans and maps, use of planimeter. Computation of Volumes- Volume from cross-sections, Trapezoidal and Prismoidal formulae, Determination of capacity of reservoir. **Setting Out Works:** Setting out Works: Building, Culvert, Bridge and Tunnel.	**10**
	Total	**45**

List of References:

1. R.Subramanian "*Surveying and leveling"* 2nd edition, 2013, Oxford university press, New Delhi.
2. Dr. A.M. Chandra, "*Plane Surveying*", 2007, New Age International (P) Ltd., New Delhi.
3. Dr. A.M. Chandra, "*Higher Surveying*", 2006, New Age International (P) Ltd., New Delhi.
4. Dr. B.C. Punamia, "*Surveying Vol. I&II*", 2016, Laxmi Publishers. New Delhi
5. S.K. Duggal "*Surveying, Vol. I, II and III"*, 2009, Tata Mcgraw Hill, New Delhi.
6. B. Bhatta, "*Remote Sensing and GIS*", Oxford University Press, New Delhi.
7. Dr. A.M. Chandra, "*Remote Sensing and GIS*", Narosa Publishers, New Delhi.
8. Sateesh Gopi, R. Sathikumar, and N. Madhu, "*Advanced Surveying*", Pearson Education India, 2007.

Course Outcomes (Cos)

At the end of this course students will be able to …

1. Use conventional instruments to map the parcels of land.
2. Show effectiveness of modern surveying instruments to improve accuracy and to save time and for surveying operations.
3. Analyze the problems of computation of area and volume, setting out of curves and works using surveying knowledge.
4. Appreciate the use of modern techniques for surveying and mapping.