GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering
Subject Code:3140601
Semester IV
SURVEYING

Type of course: Professional Core course

Rational: To develop concepts of various types of land surveying and prepare and interpret maps and drawing.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Content:

Module. No.	Topics	No. of Hours	Weightage (%)
1	**Plane Table Survey**: Introduction, principle, instruments, setting up the plane table, methods of plane tabling, advantages, sources of Errors.	4	8
2	**Theodolite Traversing**: Introduction, definitions, the Vernier transit theodolite, temporary and permanent adjustment of 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.	8	15
3	**Trigonometric levelling**: Indirect levelling, heights and distances, methods, direct levelling on steep ground.	5	8
4	**Curves**: Introduction, classification of curves, Elements of a simple circular, designation of curve, methods of setting out a simple circular curve, elements of a compound and reverse curves, transition curve, types of transition curves, combined curve, types of vertical curves.	8	15
5	**Areas and Volumes:** Introduction, computation of area, computation of area from field notes and plotted plans, boundary area, area of traverse, Use of Plannimeter, computations of volumes, Volume from cross sections, Trapezoidal and Prismoidal formulae, Prismoidal correction, Curvature correction, capacity of reservoir, volume from borrow pits.	6	10
6	**Tachometric Surveying**: Introduction, purpose, principle, instruments, methods of tacheometry, stadia constants, anallatic lens, Subtense bar, field work in tacheometry, reduction of readings, errors and precisions.	8	15
7	**Geodetic Surveying:** Introduction, triangulation, principle and uses of triangulation, triangulation systems and its classification, well-conditioned triangles, strength of figure, selection of triangulation stations and their inter-visibility, stations marks, signals, towers and scaffolds, base line, site selection and base line measurement, tape corrections, the base net, extension of base line, satellite station and reduction to centre.	6	10
8	**Theory of Errors :** Introduction, types of errors, definitions, laws of accidental errors, laws of weights, theory of least squares, rules for	6	10

	giving weights and distribution of errors to the field observations, determination of the most probable values of quantities.		
9	**Modern Surveying Instruments:** Introduction, electromagnetic spectrum, electromagnetic distance measurement, types of EDM instruments, electronic digital theodolites, total station, digital levels, scanners for topographical survey, global positioning system.	5	9

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10%	**10%**	**50%**	**10%**	**10%**	**10%**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

List of Experiment:
- Plane table traversing by intersection and radiation methods
- Techeometry Survey Project.
- Theodolite traversing and plotting of traverse by applying corrections in Gale's traverse table
- Setting out simple circular curve by different methods
- Setting out combined curve (Transition - Circular – Transition)
- Computation of area of submergence and storage volume from contour maps for reservoir projects.
- Introduction to modern surveying Instruments.

Reference Book:

Title	Author/s	Publication
Surveying and levelling	N. N. Basak	Tata Mcgraw Hill, New Delhi
Surveying -Volume I,II &III	Dr. K.R.Arora	Standard Book House, New Delhi
Surveying, Volume-I, II & II	B.C.Punmia	Laxmi Publications, New Delhi
Surveying and Levelling, Volume –I & II	T.P. Kanetkar and S.V Kulkarni	Pune Vidyarthi Griha Prakhashan, Pune
Surveying and Levelling	R.Subramanian	Oxford University Press, New Delhi
Surveying Vol. I and II	S. K. Duggal	Tata Mcgraw Hill, New Delhi
Advanced Surveying	R. Agor	Khanna Publishers, New Delhi
Surveying and Levelling	R. Agor	Khanna Publishers, New Delhi

Course Outcomes:

Students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Conduct Plane table, Theodolite, Trigonometric levelling, Tachometric, Geodetic survey at identified site.	60
CO-2	Set out simple and transition curve at given location	10
CO-3	Compute area and volume using standard rule and equipments such as Plannimeter	10
CO-4	Apply principles of theory of error for correction of measurements	10
CO-5	Conduct the survey by modern tools such as Digital Level, Total station, GPS	10

Web Material Links:

- http://nptel.ac.in/courses/105107122/
- http://nptel.ac.in/courses/105107157/
- http://nptel.ac.in/courses/105101087/
- http://nptel.ac.in/courses/105104100/
- www.svnit.ac.in