



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-1

Subject: Surveying – BTECV11301

Type of course: Professional Core

Prerequisite: - NIL

Rationale: - Before development and planning process for any civil engineering, at first field survey of that area is carried out and various type of survey maps are prepared. These maps and drawing are used for taking various decisions regarding the planning, designing, estimation, execution and construction process etc.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
04	00	02	05	60	30	10	20	30	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Continuous Assessment:

(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No	Active Learning Activities	Marks
01	Plane Table Survey Set plane table by different orientation methods on given survey station, Project in Plane Table Survey: Prepare map of open vacant land using any plane table method.	10
02	Compass Survey To Carry out the project for a closed traverse 4 to 5 stations and prepare the drawing sheet using Gale's Table.	10
03	Prepare Map Prepare on sheet contour survey.	10
Total		30



Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Surveying: Introduction, History, objectives, principles, classifications, vernier scale and telescope. Units for measurements and conversation. Traditional methods: 1) Chain survey: Ranging, Conventional signs, and measurement in survey books. 2) Compass survey: Types, bearing, meridian, and declination, temporary and permanent adjustments. 3) Plane table: introduction, principle, equipments and accessories, methods of setting out and error in plane tabling.	06	10
2	Theodolite: Introduction, classification, essential parts of theodolite, definition and technical terms, temporary and permanent adjustment of theodolite, measurements of horizontal, vertical, direct and deflection angles, ranging lines, errors in theodolite work, theodolite traversing, traverse computation, closing error and balancing traverse, Gale's tower table.	10	16
3	Curves: Introduction and classification, Designation and elements of simple circular curve, Compound curve: elements and setting out, Reverse curve: elements and setting out, Transition curve: requirements, types, characteristics, elements and setting out, Vertical curve: types, length. Setting out the vertical curve: elevation by tangent correction, elevation by chord gradient, and sight distance.	08	14
4	Tacheometry: technical terms, instruments, different system in tacheometry, distance and elevation formula for staff held vertical and inclined, anallactic lens, stadia field book, tangential methods. Errors in tachometric surveying.	04	08
5	Trigonometric leveling: introduction, different in elevation between the instrument station and the object under observation, determination height and the elevation in different conditions.	06	10
6	Areas and Volumes: Introduction, computation of area, computation of area from field notes and plotted plans, boundary area, area of traverse, Use of Planimeter, computations of volumes, Volume from cross sections, Trapezoidal and Prismoidal formulae, Prismoidal correction, Curvature correction, capacity of reservoir, volume from borrow pits.	04	08



7	Leveling and contouring: Introduction, Application of leveling, Various types of level, Field work, Curvature and refraction, Reciprocal leveling, Difficulties in leveling, Profile leveling, Field work, Cross section, Contouring: Method of contouring, Contour interval, Characteristics of contour, Uses of contour maps.	06	10
8	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.	04	08
9	Theory of Errors : Introduction, types of errors, definitions, laws of accidental errors, laws of weights, theory of least squares, rules for giving weights and distribution of errors to the field observations, determination of the most probable values of quantities.	04	08
10	Modern Surveying Instruments: Introduction, electromagnetic spectrum, electromagnetic distance measurement, electronic digital theodolite (EDM), total station, digital levels, scanners for topographical survey, global positioning system (GPS), DGPS, Unmanned Arial Vehicle, Application of GIS.	04	08
		56	100

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20	30	20	10	10	10

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.



Course Outcome:

After learning the course the students should be able to:	
CO1	Conduct Plane table, Theodolite, Trigonometric levelling, Tachometric, Geodetic survey at identified site
CO2	Set out simple and transition curve at given location
CO3	Carry out trigonometric leveling
CO4	Compute area and volume of civil engineering works
CO5	Conduct the survey by modern tools such as Digital Level, Total station, GPS

List of Practical

(Minimum-10 practical):

Sr. No	Descriptions	Unit No	Hrs
01	Perform ranging and chaining operations in different field conditions, Perform chaining and ranging where different types of obstructions are present, Take offsets (Perpendicular and Oblique) in different field conditions.	01	02
02	Perform temporary adjustments of Prismatic Compass, Determine bearings of different survey lines by using Prismatic Compass, Determine included angles from measured bearings.	01	02
03	Set plane table by different orientation methods on given survey station, Project in Plane Table Survey: Prepare map of open vacant land using any plane table method.	01	02
04	Measurement of horizontal angle by Repetition & Reiteration, Measurement of vertical angle & deflection angle	02	02
05	To Carry out the project for a closed traverse 4 to 5 stations and prepare the drawing sheet using Gale's Table.	02	02
06	Carry out the project for setting out a simple horizontal curve by Rankine's methods	03	02
07	Determine the distance and R.L. of a point when a line of sight is horizontal, Determine the distance and R.L. of a point when a line of sight is inclined for an angle of elevation. Determine the distance and R.L. of a point when a line of sight is inclined for an angle of depression.	04	04
08	Carry out the Tacheometry project for 4 to 5 stations for a closed traverse on undulating/hills regions and prepare the	04	06



	drawing sheet.		
09	Calculation of Height of Object using trigonometry survey	05	02
10	Carry out fly levelling in different field conditions, Carry out profile levelling in different field conditions.	07	04
	Total		28

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Surveying and levelling Vol-I	T. P. Kanetkar & S. V. Kulkarni	Puna Vidyarthi Griha Prakashan
2	Surveying and Levelling Vol-II	T. P. Kanetkar & S. V. Kulkarni	Puna Vidyarthi Griha Prakashan
3	Surveying and Levelling Vol-I	Dr. B. C. Punmia	Laxmi Publications Pvt. Ltd.
4	Surveying and Levelling Vol-II	Dr. B. C. Punmia	Laxmi Publications Pvt. Ltd.
5	Fundamentals of Surveying	S. K. Roy	PHI Learning Pvt. Ltd
6	Surveying and Levelling, 2nd Edition	N N Basak	McGraw Hill Education Pvt. Ltd
7	A Textbook of Surveying and Levelling	R. Agor	Khanna Publishers

