

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Diploma Engineering				Branch	Civil Engineering			
Semester	IV				Version	1.0.0.0			
Effective from Academic Year		2019-20			Effective for the batch Admitted in			June 2019	
Subject code	1CI2402		Subject Name		Advance Surveying				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	2	0	5	Theory	40	60	100
Hours	3	0	4	0	7	Practical	30	20	50

Pre-requisites:
Surveying 1CI 2302

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:
CO1. To understand how to use theodolite for the measurement of horizontal and vertical angle.
CO2. To Calculate the height of objects through a trigonometrical levelling
CO 3. To describe the principles and various methodologies involved in techeometry.
CO 4. Retrieve the data and generate the drawings using advanced surveying equipment & application Software.
CO 5. To interpret the survey output i.e. maps & drawings, and find out different physical quantities like length, area, volume, elevations, angles, latitude, departure, etc.

Course Content				
Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
UNIT – 1 THEODOLITE	1.1 Introduction to theodolite	1a. Build knowledge of the basic functions of different parts of theodolite. 1b. Use theodolite and read horizontal and vertical angle. 1c. Calculate the altitude and departure of given points on ground.	18	14
	1.2 Uses of theodolite			
	1.3 Draw the parts of Transit Vernier theodolite			
	1.4 Reading of main and vernier scale on horizontal and vertical plate.			
	1.5 Temporary adjustment of a theodolite.			
	1.6 Permanent adjustment of a theodolite.			
	1.7 Various terms related to theodolite and their definitions.			
	1.8 Methods of measuring horizontal angles and vertical angles.			
	1.9 Use of theodolite for measuring a magnetic bearing , deflection angle, ranging and prolonging a line			
	1.10 Errors in theodolite work.			

	<p>1.11 Theodolite Traversing.</p> <p>1.12 Traverse computations</p> <p>1.13 Closing errors, Balancing the traverse</p> <p>1.14 Gale's Traverse Table.</p> <p>1.15 Numerical examples.</p>			
UNIT – 2 TACHEOMETRY	<p>2.1 Introduction</p> <p>2.2 Purpose and Principles of tacheometric surveying</p> <p>2.3 Instruments used in Tacheometry</p> <p>2.4 Theory of Stadia Tacheometry</p> <p>2.5 Anallatic Lens</p> <p>2.6 Methods of determining constants of a Tacheometer</p> <p>2.7 Examples on tacheometer constants</p> <p>2.8 Methods of Tacheometry (Stadia and Tangential)</p> <p>2.9 Method of Fixed Hair</p> <ul style="list-style-type: none"> - When line of sight is horizontal and staff held vertically - When line of sight is inclined and staff held vertically (Angle of Elevation & Depression) <p>2.10 Advantages and disadvantages of Tangential method</p> <p>2.11 Examples of Tacheometer using all methods</p>	<p>2a. Describe the principles and various methodologies involved in tacheometry.</p> <p>2b. Calculate R.L. and horizontal distance between object and instrument.</p>	15	10
UNIT – 3 TRIGONOMETRICAL LEVELLING	<p>3.1 Introduction</p> <p>3.2 Methods of observations (Direct and Reciprocal)</p> <p>3.3 Methods of determining the elevation of a particular point</p> <ul style="list-style-type: none"> - When base of the object is accessible - When base of the object is inaccessible <p>3.4 Examples using all methods</p>	<p>3a. Calculate relative elevations and angular measurements for given different conditions of instruments.</p> <p>3b. Calculate the height of objects through a trigonometrical levelling.</p>	07	06
UNIT – 4 CURVES	<p>4.1 Introduction</p> <p>4.2 Types of circular curves</p> <p>4.3 Definitions and notations</p> <p>4.4 Designation of curve</p> <p>4.5 Relation between Radius and degree of curve</p> <p>4.6 Elements of simple circular curve</p> <p>4.7 Setting out simple circular curve</p> <p>4.8 Methods of setting out simple circular curves</p> <p>4.9 Examples of curves.</p>	<p>4a. Describe different elements of curves.</p> <p>4b. Calculate necessary data required for setting out curve on field.</p>	12	08

	4.10 Vertical curves			
UNIT – 5 ADVANCED SURVEY EQUIPMENTS	5.1 Introduction	5a. Describe the principles of total station and to develop skill how to use it. 5b. Record the data on total station as well as on computer. 5c. Retrieve the data and generate the drawings using application software.	08	07
	5.2 Basics of Digital theodolite			
	5.3 Introduction and Principles of E.D.M.			
	5.4 Introduction and Basics of Total station - Parts of Total station - Advantages, disadvantages and uses of Total Station - Types of Total Station - Set up of Total Station			
	5.5 Precautions to be taken while using Total Station			
	5.6 Surveying using Total Station			
		Total	60	45

List of Practical		
No.	Unit	Name of Practical
1	1	To demonstrate transit vernier theodolite.
2	1	To measure - Horizontal angle by repetition and reiteration method with the use of theodolite. - Vertical angle with the use of theodolite. - Deflection angle with the use of theodolite.
3	1	To construct a closed traverse with 4 to 5 stations and prepare the drawing sheet using Gale's traverse table.
4	2	To measure the tacheometric constant
5	2	To measure the distance and R.L. of a point - When line of sight of horizontal. - When line of sight is inclined for an angle of elevation. - When line of sight is inclined for an angle of depression.
6	2	To construct a closed traverse on undulating/hilly region with 3 to 4 stations and prepare a drawing sheet of it.
7	4	To calculate the data for setting out a simple circular curve By Rankine's (one theodolite) method.
8	5	To demonstrate Total Station.
9	5	To carry out the project for small traverse on a ground and prepare the drawing sheet.

List of Instruments / Equipment / Trainer Board	
1	Transit Theodolite
2	Digital Theodolite
3	Levelling Staff
4	Tacheometer
5	Total Station and its accessories

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Surveying and Levelling Vol-I & II	Dr. B. C. Punmia	Laxmi Publications Pvt. Ltd.
2	Surveying and Levelling Vol-I & II	S.K.Hussain, M.S. Nagaraj	S. Chand and co.
3	Surveying and Levelling Vol-I & II	S. K. Duggal	Tata Mc Graw Hill
4	Surveying and Levelling	N. N. Basak	Tata Mc Graw Hill

Link of Learning Web Resource	
1	www.Autodesk.com
2	www.drawingnow.com
3	www.learn-to-draw.com

PO & CO Mapping

Sr.No.	Name of PO	Description	Co1	Co2	Co3	Co4	Co5
1	PO 1	Acquire fundamental knowledge of mathematics, science, and civil engineering.	Moderate	Moderate	Slight	Slight	Slight
2	PO 2	Design and conduct experiments, as well as analyze and interpret data.	Slight	Moderate	Slight	Slight	Slight
3	PO 3	Use the techniques, skills, and modern engineering tools necessary for engineering practice	Slight	Slight	Slight	Slight	Slight
4	PO 4	Function in multi-disciplinary teams and identify, formulate, and solve engineering problems.	None	Slight	Slight	Slight	Slight
5	PO 5	Clear understanding of his duties and responsibilities as a civil engineer.	None	None	None	None	Moderate
6	PO 6	Develop effective communication skill and provide leadership for professional development.	None	None	None	None	None
7	PO 7	Engage in life-long learning in civil engineering field and comprehend issues related to environment and sustainable development.	None	None	None	None	None
8	PO 8	Graduate will demonstrate knowledge of professional and ethical responsibilities.	None	None	None	None	None
9	PO 9	Incorporate economics and business practice including project and risk management.	None	None	None	None	None
10	PO 10	Graduated are able to share their knowledge to the industries as well as society.	None	Slight	Slight	Slight	Slight
11	PO 11	Graduated will be able to apply their skill and knowledge for the sustainable development of nation.	None	Slight	Slight	Slight	Slight
12	PO 12	Graduated are able to learn to work with with the team and also with the inter discipliners.	None	None	None	None	None