

GANPAT UNIVERSITY				
FACULTY OF DIPLOMA ENGINEERING				
Programme	Diploma		Branch/Spec.	Agricultural Engineering
Semester	IV		Version	2.0.0.1
Effective from Academic Year	2026-27		Effective for the Batch admitted in	July 2025
Course Code	1AE4103	Course Name	Surveying and Leveling	

I. TEACHING, LEARNING AND ASSESSMENT SCHEME																				
Course Type	Course Code	Course Title	Total IKS Hrs for Sem	Learning Scheme					Credits	Examination Scheme										
				Actual Contact Hrs/week			SLH	NLH		TH				PR				SLA		Total
				CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL				
												Max	Min			Max	Min	Max	Min	
AEC	1AE4103	Surveying and Levelling	-	1	0	4	1	6	3	40	60	100	40	30	20	50	20	20	8	170

Abbreviations:	CL- Classroom Learning	TL- Tutorial Learning	LL- Laboratory Learning
	SLH- Self Learning Hour	NLH- National Learning Hour	SLA- Self Learning Assessment
	FA- Formative Assessment (Term work + Mid Exam + Attendance)		SA- Summative Assessment

II. PRE-REQUISITES
Students should have basic knowledge of elementary mathematics including algebra, geometry, and trigonometry, fundamental concepts of engineering drawing, understanding of measurements and units, and familiarity with field work and land features.

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES
After completing the course, learners will be able to assist in land surveying and layout work for agricultural, civil, and infrastructure projects, operate surveying instruments such as levels, theodolites, total stations, and GPS, and perform area and volume calculations for planning and earthwork.

IV. COURSE LEARNING OUTCOMES
CO-1. Identify and recall the basic principles, classification, and instruments used in surveying, including chain surveying, compass surveying, plane table surveying, and leveling.
CO-2. Explain the working principles, errors, and corrections in various surveying methods, including the use of theodolites, total stations, and GPS technology.
CO-3. Demonstrate the ability to conduct field surveys, compute areas and volumes, set curves, and utilize modern surveying instruments for precise measurements.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:		
Unit	Content	Hrs.
1	Surveying: Introduction, classification and basic principles, Linear measurements. Chain surveying. Cross staff survey, Compass survey. Planimeter, Errors in measurements, their elimination and correction. Plane table surveying..	6
2	Levelling, Leveling difficulties and error in leveling, Contouring, Computation of area and volume. Theodolite traversing	5
3	Introduction to setting of curves. Total station, Electronic Theodolite. Introduction to GPS survey	4

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL
- Chain survey of an area and preparation of map. - Compass survey of an area and plotting of compass survey. - Plane table surveying. - Levelling. L section and X sections and its plotting. - Contour survey of an area and preparation of contour map. - Introduction of software in drawing contour. - Theodolite surveying; Ranging by Theodolite, - Height of object by using Theodolite; Setting out curves by Theodolite;

VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)
Conduct chain surveying of the institute campus or nearby field and prepare a layout plan

- Carry out levelling and prepare contour maps for a selected land area
- Compute area and earthwork volume using field data
- Case study on total station or GPS survey and its applications
- Numerical problems and field demonstration related to setting of simple curves

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

1. Chain and Tape
2. Ranging Rods
3. Cross Staff / Optical Square
4. Prismatic Compass
5. Plane Table with Accessories
6. Dumpy Level / Auto Level
7. Levelling Staff
8. Planimeter
9. Theodolite
10. Total Station (Demonstration Unit)
11. GPS Survey Receiver (Demo)
12. Surveying Instrument Trainer Boards

IX. LIST OF REFERENCE BOOKS

1. Surveying (Vol.I) by Punmia, B C 1987. Laxmi Publications, New Delhi.
2. Surveying (Vol.I) by Arora, K R 1990. Standard Book House, Delhi.
3. Surveying and Levelling by Kanetkar, T P 1993. Pune Vidyarthi Griha, Prakashan, Pune.

X. LINK OF LEARNING WEB RESOURCE

1. <https://onlinecourses.swayam2.ac.in>
2. <https://nptel.ac.in>
3. <https://civiltoday.com/surveying>
4. <https://www.civilenggforall.com>
5. <https://www.slideshare.net>
6. <https://www.wikipedia.org/wiki/Surveying>

XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

Unit	Unit Title	Aligned COs	Learning Hours	U-Level	R-Level	A-Level	Total Marks
1.	Principles of Surveying, Chain, Compass & Plane Table Surveying	CO1, CO2	6	6	5	2	13
2	Levelling, Contouring, Area & Volume Computation, Theodolite Traversing	CO2, CO3	5	4	5	4	13
3	Curves, Total Station, Electronic Theodolite & GPS Survey	CO2, CO3	4	3	4	5	12

XII. COs AND POs AND PSOs MAPPING

Course outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	0	0	0	0	0	2	1	0
CO2	3	2	1	0	1	0	0	3	2	0
CO3	2	3	2	1	2	0	0	2	3	1