

25UAGL404	SURVEYING AND LEVELLING LAB	Category	L	T	P	R	Cred it	Year of Introduction
		PCC	0	0	3	0	2	2025

Preamble

This course provide practical knowledge and hands-on training in the use of surveying instruments and field measurement techniques. The course aims to develop the ability to conduct linear, angular and levelling surveys, prepare survey maps and contour plans, and apply modern surveying tools such as theodolite and total station for agricultural land development, irrigation planning and infrastructure projects.

Prerequisite: Nil

Course Outcomes (COs)

After the completion of the course,the student will be able to

CO	Course Outcomes	Knowledge Level
CO1	Use conventional surveying tools such as chain/tape and compass for plotting and area determination.	K3 Apply
CO2	Apply levelling principles in field to determine elevations.	K3 Apply
CO3	Perform theodolite and tacheometric surveys to determine distances, heights, and level differences.	K3 Apply
CO4	Compute height,distance and contouring using total station and demonstrate the use of modern surveying instruments.	K3 Apply

Mapping of course outcomes with program outcomes and program specific outcomes

	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	O	O	O	O	O	O	O	O	O	O	O	O	O	S	S		
	1	2	3	4	5	6	7	8	9	1	1	0	1	1	2		
CO1	C	3	2	2	3	-	-	-	-	-	-	-	3	3			
CO2	C	3	3	2	3	-	3	2	-	-	-	-	3	3			
CO3	C	3	3	3	3	3	3	2	-	-	-	-	3	3			
CO4	C	3	3	3	3	3	3	2	-	-	-	2	3	3			
Av g	A	3	2	2	3	3	3	2	-	-	-	2	3	3			
			.	.													
			7	5													
			5														

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation

Mapping of Course Outcomes with Knowledge and Attitude Profile (WK)

CO	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*	*			*	
CO2	*	*	*	*	*		*	*	*
CO3	*	*	*	*	*	*	*	*	*
CO4	*	*	*	*	*	*	*	*	*

Wks Mapped with the Course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*	*	*	*	*

Mark Distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	50	50	3hrs

List of Experiments

Expt. No.	Experiments
1	Study of instruments used for chain survey- Chain, Ranging, Measurement of distance and area.
2	Compute the area of a plot using Compass survey
3	Plane Table Survey - Study of instruments, Radiation, Intersection
4	Simple Levelling & Differential Levelling
5	Profile and Cross section
6	Determination of distance between two points using theodolite
7	Determination of level difference between two points using theodolite
8	Determination of height of an object using theodolite
9	Tacheometric Survey I-Horizontal distance measurement
10	Tacheometric Survey II-Measurement of elevation difference between points and the gradient between them.
11	Compute the height and slope distance using total station
12	Compute the area of the plot using total station
13	Contouring using total station
14	Study of instruments: Automatic level , Digital level ,Handheld GPS

*** A minimum of 12 experiments is mandatory**

Continuous Internal Evaluation Marks (CIE)

- Attendance : 5 marks
- Preparation/Pre-Lab Work experiments, Viva and Timely completion of Lab Reports / Record (Continuous Assessment) : 25 marks
- Internal Examination: 20 marks

End Semester Examination Marks (ESE)

- Procedure/ Preparatory work/Design/Algorithm : 10 marks
- Conduct of experiment/ Execution of work/ troubleshooting/ Programming : 15 marks
- Result with valid inference/ Quality of Output : 10 marks
- Viva voce : 10 marks
- Record: 5 marks

Submission of Record: Students shall be allowed for the end semester examination only upon submitting the duly certified record.

Continuous Assessment (25 Marks)

Preparation and Pre-Lab Work (7 Marks)

- Pre-Lab Assignments: Assessment of pre-lab assignments or quizzes that test understanding of the upcoming experiment.
- Understanding of Theory: Evaluation based on students' preparation and understanding of the theoretical background related to the experiments.

Conduct of Experiments (7 Marks)

- Procedure and Execution: Adherence to correct procedures, accurate execution of experiments, and following safety protocols.
- Skill Proficiency: Proficiency in handling equipment, accuracy in observations, and troubleshooting skills during the experiments.
- Teamwork: Collaboration and participation in group experiments.

Lab Reports and Record Keeping (6 Marks)

- Quality of Reports: Clarity, completeness and accuracy of lab reports. Proper documentation of experiments, data analysis and conclusions.
- Timely Submission: Adhering to deadlines for submitting lab reports/rough record and maintaining a well-organized fair record.

Viva Voce (5 Marks)

- Oral Examination: Ability to explain the experiment, results and underlying principles during a viva voce session.

Final Marks Averaging: The final marks for preparation, conduct of experiments, viva, and record are the average of all the specified experiments in the syllabus.

Evaluation Pattern for End Semester Examination (50 Marks)

Procedure/Preliminary Work/Design/Algorithm (10 Marks)

- Procedure Understanding and Description: Clarity in explaining the procedure and understanding each step involved.
- Preliminary Work and Planning: Thoroughness in planning and organizing materials/equipment.
- Algorithm Development: Correctness and efficiency of the algorithm related to the experiment.
- Creativity and logic in algorithm or experimental design.

Conduct of Experiment/Execution of Work/Programming (15 Marks)

- Setup and Execution: Proper setup and accurate execution of the experiment or programming task.

Result with Valid Inference/Quality of Output (10 Marks)

- Accuracy of Results: Precision and correctness of the obtained results.
- Analysis and Interpretation: Validity of inferences drawn from the experiment or quality of program output.

Viva Voce (10 Marks)

- Ability to explain the experiment, procedure results and answer related questions
- Proficiency in answering questions related to theoretical and practical aspects of the subject.

Record (5 Marks)

- Completeness, clarity, and accuracy of the lab record submitted

Text Books

1. Bansal, R. K. (2018). *Surveying and Levelling*. Laxmi Publications, New Delhi.
2. Duggal, S. K. (2013). *Surveying (Vol. I & II)*. Tata McGraw Hill Education, New Delhi.
3. Basak, N. N. (2014). *Surveying and Levelling*. McGraw Hill Education (India).

Reference Books

1. Arora, K. R. (2015). *Surveying (Vol. I, II & III)*. Standard Book House, New Delhi.
2. Kanetkar, T. P., & Kulkarni, S. V. (2010). *Surveying and Levelling (Part I & II)*. Pune Vidyarthi Griha Prakashan.
3. Punmia, B. C., Jain, A. K., & Jain, A. K. (2016). *Surveying*. Laxmi Publications, New Delhi.

Video Links (NPTEL, SWAYAM...)

- <https://nptel.ac.in/courses/105105117>
- <https://nptel.ac.in/courses/105107155>
- <https://www.youtube.com/watch?v=0oY2k9u4m7Q>
- <https://www.youtube.com/watch?v=EwpD9SxV6L8>