Program : **Diploma in Civil Engineering**	
Course Code : **3016**	Course Title: **Surveying Lab**
Semester : **3**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per semester: **45**

Course Objectives:

- To enable the students to perform contouring and to use theodolite for obtaining angular measurements and perform traversing.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge of Basic Mathematics		Engineering Mathematics	1
Basic Surveying		Basic Surveying	3

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Prepare contour maps using leveling instrument.	6	Applying
CO2	Measure the horizontal angle using theodolite	10	Applying
CO3	Measure the vertical angle using theodolite	12	Applying
CO4	Perform traversing using theodolite and prepare plans	13	Applying
	Lab Tests	4	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3			
CO2				3			
CO3	3			3			
CO4	3			3			

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Prepare contour maps using leveling instrument.**		
M1.01	Take spot levels and prepare contour map	6	Applying
CO2	**Measure horizontal angle using theodolite**		
M2.01	Perform temporary adjustments of theodolite	2	Applying
M2.02	Measure horizontal angles by repetition method	3	Applying
M2.03	Measure horizontal angles by reiteration method	3	Applying
M2.04	Prolong a line using theodolite Measure the bearing of a line using theodolite	2	Applying
	Lab Test-I	2	
CO3	**Measure vertical angle using theodolite**		
M3.01	Determine the difference in elevation and distance between two stations by measuring vertical and horizontal angles (single station)	3	Applying
M3.02	Determine difference in level and horizontal distance between two points by observation from the ends of the base line.	3	Applying
M3.03	Find the elevation of tall object (base accessible) using theodolite	3	Applying
M3.04	Find the elevation of a tall object (base inaccessible) using theodolite (both instrument stations and object are in same vertical plane)	3	Applying

CO4	**Perform traversing using theodolite and prepare plans**		
M4.01	Perform theodolite traversing and record observation.	6	Applying
M4.02	Compute included angles, latitude, departure, and prepare Gale's traverse table.	5	Applying
M4.03	Plot the traverse and find the area	2	Applying
	Lab Test-II	2	

Text / Reference:

T/R	Book Title/Author
T1	Punmia, B.C,; Jain, Ashok Kumar; Jain, Arun Kumar, Surveying I, Laxmi Publications., New Delhi
R2	Basak, N. N., Surveying and Levelling, McGraw Hill Education, New Delhi
R3	Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling volume I, Pune Vidyarthi GruhPrakashan
R4	Duggal, S. K., Survey I, McGraw Hill Education, New Delhi.
R5	Saikia, M D.; Das. B.M.; Das. M.M., Surveying, PHI Learning, New Delhi
R6	Subramanian, R., Fundamentals of Surveying and Levelling, Oxford University Press. New Delhi
R7	De,Alak, Plane Surveying, S.Chand Publications, New Delhi.
R8	Rao, P.VenugopalaAkella, Vijayalakshmi, Textbook of Surveying, PHI Learning
R9	Venkatramaiah, C, Textbook of Surveying, Universities Press, Hyderabad.
R10	Anderson, James M and Mikhail, Edward M, Surveying theory and practice, Mc Graw Hill Education, Noida.

Online Resources:

Sl. No	Website Link
1	http://www.vlab.co.in/ba-nptel-labs-civil-engineering
2	https://nptel.ac.in/courses