

01CI0303: Surveying
Objective of the Course

Objectives of introducing this subject at second year level in civil branches are:

- To know different field method of surveying.
- To calculate internal angles of the traverse.
- To calculate latitude and departure of traverse lines.
- To study types of curves and their field setting out.
- To understand method to calculate area and volume.
- To apply concept of area and volume to field applications like quantity of cutting & filling or capacity of reservoir.

Credits Earned: 3

Students Learning Outcomes

After studying this subject students will be able to:

- Understand basic principles of various methods of surveying.
- Obtain the included angles, latitude and departure of the traverse lines on the field.
- Set the different types of curves on the field during survey work.
- Analyze, calculate and measure the area and volumes of the different capacities and topographical situations. The calculation required to find the storage capacity of a reservoir and relevant survey and earth work to be carried out shall be possible after learning the area and volume calculation methods.

Teaching and Examination Scheme

Subject Name	Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
	Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Internal (I)	Viva (V)	Term Work (TW)	
Surveying	2	0	2	3	30	30	10	30	50	150

Detailed Syllabus

Sr. No.	Topic Name	Hours
1	Theodolite Survey	8
	Introduction, Fundamental definitions, Theodolite and its functioning, Measurement of vertical and horizontal angles, Methods of theodolite traversing, Closing error, Calculation of latitudes and departure, checks and balancing of traverse, Gale's traverse table, Omitted measurements.	
2	Trigonometric leveling	3
	Method of indirect leveling, Methods of leveling on steep ground.	

Sr. No.	Topic Name	Hours
3	Tacheometry Definitions, Principle of techeometry, Self-reducing tacheometers and methods.	3
4	Curves Introduction, Basics and geometry, Issues in curve location, Elements and setting out of circular and transit curves, Elements of vertical curves.	8
5	Field Area & Volumes Calculation of areas having regular & irregular boundaries, Trapezoidal formula, Simpson's rule, Digital planimeter, computation of volume for Earthwork volume calculation for cutting & filling, Volume from cross sections Calculation of reservoir capacity.	6
Total		28

List of Practicals

1. Traversing by the Theodolite and traverse plotting by applying corrections in Gale's traverse table.
2. Setting out the simple circular curve using various methods.
3. Setting out the combined curve including (a) Transition (b) Circular (c) Transition.
4. Setting out the foundation for simple building.
5. Computation of area of submergence and storage volume from contour maps for reservoir projects.

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	30%	40%	15%	10%	00%

Instructional Method and Pedagogy

1. Students shall have a brief on the expected information and knowledge of the topics related to the course before the start of the subject.
2. By appropriate teaching aids and the theory sessions, all the lectures shall be conducted in the class room.
3. The academic session's attendance shall carry 5% weightage in overall evaluation of the student.
4. Based on the theory topics and contents taught in the academic sessions, the students shall be offered an assignment /tutorial / drawing sheet for each spate topic as a part of the submission.
5. All the field exercises and experimental work shall be conforming to the relevant theory topic taught. The experiments shall be designed in a way that brings full clarity and understanding about the subject contents to the students.

Recommended Study Material**Text Books**

1. Dr. B.C. Punamia, Surveying Vol.I, II and III, Laxmi Publication
2. S. K. Duggal, Surveying Vol. I and II, Tata McGraw-Hill Education

Reference Books

1. Dr. K.R. Arora, Surveying Vol. I, II and III, Standard Book House, New Delhi
2. N.N. Basak, Surveying and Levelling, Tata McGraw-Hill Education
3. R. Agor, Surveying and Levelling, Khanna Publishers, New Delhi
4. R. Agor, Advanced Surveying, Khanna Publishers, New Delhi
5. Subramanian, R., Surveying and Leveling, Oxford University Press, New Delhi