

Branch Name:	Civil engineering
Program Code:	ET401
Course Name:	Basic Surveying
Course Code:	2ET4010302
Pre-requisite Course:	---

COURSE OBJECTIVE:

Following are the objectives of this course:

- To understand types of surveying works required.
- To know the various method and equipment to be used for different surveys.
- To know the use and operational details of various surveying equipment.
- Carry out civil engineering survey to prepare drawings & maps.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
3	-	4	5	60	40	40	60

DETAILS OF COURSE CONTENTS:

S. NO.	TOPIC	Total Hrs.	WEIGHTAGE (%)
1	Introduction 1.1 Definitions. 1.2 Objective and uses of surveying. 1.3 Plain and Geodetic Survey. 1.4 Classification of Survey. 1.5 Principles of Survey. 1.6 Types of Scale and Representative fraction. 1.7 Duties & Responsibilities of a Surveyor	05	15
2	Linear Measurements 2.1. Instruments used in chain survey: Metric Chain, Tapes, Arrow, Ranging rod, Line ranger, Offset. 2.2. Technical terms related with chain survey, Survey Station, Base line, Check line, Tie line, Tie station, Offset, Location sketch. 2.3. Ranging: Direct and Indirect Ranging. 2.4. Instruments used in linear measurements: Metric Chain, Tapes, Arrow, Ranging rod, Line ranger,	10	20

	optical square and EDM 2.5. Errors in length due to incorrect length and related problems. 2.6. Conventional Signs and symbols. 2.7. Recording of measurements in a field book. 2.8. Computation of an area.		
3	Angular Measurements 3.1. Types of compasses and traversing. 3.2. Components of Prismatic Compass. 3.3. Differentiate Prismatic and Surveyor compass. 3.4. Technical Terms - True Meridian, Magnetic Meridian, Arbitrary Meridian, Dip of Magnetic needle, Declination, Fore Bearing, Back Bearing, Whole Circle Bearing System and Reduced Bearing System. 3.5. Examples on conversion of given bearing to another bearing (from one form to another). 3.6. Method of finding included angles from bearings & examples. 3.7. Local attraction and closing error, Graphical method to adjustment of closing error of traverse. 3.8. Use of trough compass and tubular compass for angular measurement	10	20
4	Leveling and Contouring 4.1. Basic terminology related with levelling like Level surfaces, Horizontal & vertical surfaces, Datum, Bench Marks, Reduced Level, Rise, Fall, Line of collimation, Axis of Telescope, Axis of bubble tube, Station, Back sight, Fore sight, intermediate sight, Change point, Height of instruments etc. 4.2. Types of levels: Tilting level, Auto level, Digital level, Components of Dumpy Level with neat sketch. 4.3. Temporary adjustments of Level and types of levelling staff. 4.4. Classification of Levelling - Simple Levelling, Differential Levelling, Fly Levelling, Profile Levelling, Reciprocal Levelling. 4.5. methods of finding out the R. L. in Level Book by H.I. Methods and Rise & Fall Methods with necessary check and its examples. 4.6. Errors in leveling and its elimination. 4.7. Contour and use of contour map. 4.8. Characteristics of contours. 4.9. Methods of Contouring. 4.10. Levelling by Auto level instrument instead of	12	30

	dummy level.		
5	Plane Table Survey 5.1. Equipment and accessories of plane table survey. 5.2. Advantages and disadvantages of plane table survey. 5.3. Setting up plane table over the station- centering, leveling and orientation. 5.4. Methods of plane table surveying- radiation, intersection, traversing, and resection. 5.5. Types of error in survey	05	15

LIST OF PRACTICAL:

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of practical skills so that students are able to acquire the competencies (Programme outcomes). Following is the list of exercises/practical/experiments for guidance.

SR. No.	Experiment / Practical
1	Measure distance between two survey stations using chain, tape and ranging rods.
2	Perform ranging and chaining operations in different field conditions.
3	Take offsets (Perpendicular and Oblique) in different filed conditions and line out foundation plan on field.
4	Determine bearings and angles of different survey lines by using Prismatic Compass.
5	Undertake Survey Project with chain and compass for closed traverse.
6	Plot the traverse on A1 size imperial drawing sheet for data collected in Survey Project with chain and compass for closed traverse.
7	Undertake simple leveling using dummy level/ Auto level and leveling staff.
8	Undertake differential leveling and determine Reduced Levels by Height of instrument method and Rise and fall method using dummy level/Auto Level and leveling staff.
9	Undertake Survey Project of leveling and contouring for plotting contour map.
10	Plot the contours on A1 size imperial drawing sheet for data collected in Survey Project of leveling and contouring.
11	Set plane table by different orientation methods on given survey station
12	Use plane table survey to carry out Survey Project for closed traverse around a building and prepare a map.

LIST OF REFERENCES:

1. Surveying and Levelling Vol. - I - By Dr. B.C Punmia..- Laxmi Publications.
2. Surveying and Levelling - By N. N Basak. - McGraw Hill Education, New Delhi.

3. Fundamentals of Surveying and Levelling - By R. Subramanian. - Oxford University Press.
4. Surveying Vol. I - By K. R. Arora. - Standard Book House.

LIST OF OPEN SOURCE SOFTWARE/LEARNING WEBSITE:

1. <http://www.nptel.iitm.ac.in/video>
2. www.Autodesk.com
3. www.drawingnow.com
4. www.learn-to-draw.com

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To understand types of surveying works required.	2 Understanding
CLO2	To know the various method and equipment to be used for different surveys.	2 Understanding 3 Applying,
CLO3	To know the use and operational details of various surveying equipment.	2 Understanding, 3 Applying 5 Evaluate
CLO4	Carry out civil engineering survey to prepare drawings & maps.	5 Evaluate 6 Creating
CLO5	Select the type of survey required for given situation	4 analyzing
CLO6	To know methods of plane surveying and their uses.	3 Applying, 2 Understanding

Course Learning Outcomes	Program Outcomes(Po's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO1	M											
CLO2	H				H				M			
CLO3	M				M							
CLO4			M		H				M		H	
CLO5			M		H				L			
CLO6	H	M			M						M	

H: High, M: Medium, L: Low