

Branch Name:	Civil engineering
Program Code:	ET401
Course Name:	Advance Surveying
Course Code:	2ET4010402
Pre-requisite Course:	---

COURSE OBJECTIVE:

Following are the objectives of this course:

- To know methods of Theodolite surveying and their uses.
- To learn trigonometric leveling, tacheometric surveying and curve setting.
- To understand the principles and uses of Advance equipment like Total station and GPS.

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	Theodolite Traversing 1.1 Introduction and use of theodolite. 1.2 Components of transit Theodolite, their functions and Fundamental axes of transit Theodolite and their relationship. 1.3 Technical terms- Swinging, Transiting, Face left, Face right, etc. 1.4 Temporary adjustment of transit Theodolite. 1.5 Methods of measuring horizontal angles and vertical angles. 1.6 Use theodolite for measuring a magnetic bearing 1.7 Theodolite traversing and closing error. 1.8 Traverse computation-Latitude, Departure, Consecutive coordinates, independent coordinates. 1.9 balancing the traverse by Bowditch and Transit rule. 1.10 Gale's Traverse table computation and related examples. 1.11 Draw traverse after co ordinate calculation and correction	10	20%

2	Trigonometry and Tacheometry Survey 2.1. Introduction 2.2. Methods of determining the elevation / height of a particular point. 2.3. When base of the object is accessible. 2.4. When base of the object is inaccessible. Related examples using all methods. 2.5. Purpose and Principles of tacheometric surveying. 2.6. Theory of Stadia Tacheometry and Analytic Lens 2.7. Methods of determining constants of a Tacheometer 2.8. Related examples on tacheometer constant Methods of Tacheometry (Stadia & Tangential). 2.9. Related examples of Tacheometer using all methods	10	25%
3	Total Station Survey 3.1 Introduction and Basics of Total station - Parts of Total station - Advantages, disadvantages and uses of Total Station - Types of Total Station - Advancement in Total Station Technology - Automatic Target Recognition ATR 3.2 Surveying using Total Station - Flow chart of data collection - Fundamental Parameters of Total Station. 3.3 Precautions to be taken while using Total Station 3.4 Field equipment. 3.5 Set up of Total Station - Centering, Levelling , back-sight, Azimuth Marks 3.6 Measurement with Total Station 3.7 Total Station Initial Setting 3.8 Field Book recording 3.9 Radial Shooting 3.10 Total Station Traversing 3.11 Survey Station description, Occupied Point Entries 3.12 Data Retrieval 3.13 Equipment Maintenance 3.14 Controlling errors 3.15 Use of Contour software	10	25%
4	Global Positioning System 4.1 Introduction to GPS 4.2 Maps & types of digital map 4.3 Fundamentals and uses of GPS 4.4 GPS Receivers (Hand-Held GPS Receivers) 4.5 Field procedures of GPS 4.6 Observations and applications in Civil Engineering 4.7 Introduction and use of modern surveying equipments such as Differential Global Positioning System (DGPS), Unmanned Aerial Vehicle(UAV). 4.8 Understanding GIS and its components	06	15%

	4.9 Applications of GIS 4.10 Basic overview on drone survey and LIDAR survey		
5	Curves. 4.1. Introduction. 4.2. Types of circular curves. 4.3. Elements of simple circular curve. 4.4. Definitions. Notations and Designation of curve. 4.5. Relation between Radius and degree of curve. 4.6. Methods of setting out simple circular curves. Related examples of curves.	06	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	Identify and use of various parts of the theodolite.
2	Use transit theodolite to measure Horizontal and Vertical angle.
3	To Carry out the project for a closed traverse 4 to 5 stations and prepare the drawing sheet using Gale's Table.
4	Measure and calculate the height of objects through a trigonometrical levelling.
5	Determine the tacheometric constant.
6	Use Theodolite as a Tacheometer to compute reduced levels and horizontal distances.
7	To Carry out the project for a 3 to 4 stations for closed traverse on undulating/hills regions and prepare the drawing sheet.
8	Determine the elements of simple circular curve.
9	Set out a circular curve by different methods and prepare the drawing sheet.
10	Use Total station instrument to measure coordinates and horizontal distances.
11	Use Total station instrument to measure area on field.
12	Use Total station instrument to carry out Survey Project for closed traverse and make a auto cad drawing from collected data by Total Station Survey Project.

LIST OF REFERENCES:

1. Surveying and Levelling Vol - I & II - By Dr. B.C Punmia..- Laxmi Publications.
2. Surveying and Levelling - By N. N Basak. - McGraw Hill Education, New Delhi.
3. Fundamentals of Surveying - By S. K. Roy - PHI Learning Pvt. Ltd.
4. Survey I and Survey II - By S. K. Duggal, - Tata McGraw Hill Education Pvt. Ltd., Noida.

5. Surveying and Levelling Vol-I & II - S.K.Hussain, M.S. Nagaraj - S. Chand and Co.
6. CD Programme on Total Station and GPS - Learning Materials Development Project - Taramani, Chennai NITTTR, Bhopal.

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 know methods of Theodolite surveying and their uses.	2 Understanding
CLO2	To learn trigonometric leveling, tacheometric surveying and curve setting.	2 Understanding
CLO3	To understand the principles and uses of Advance equipment like Total station and GPS.	2 Understanding, 3 Applying
CLO4	Calculate the height of objects through a trigonometrically leveling.	3 Applying, 5 Evaluate
CLO5	Find distances and elevations using Tachometer.	5 Evaluate,
CLO6	Prepare survey maps/drawing after carrying out different kinds of field surveys using advance surveying equipment.	3 Applying, 4 Analyzing 5 Evaluate

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

H: High, M: Medium, L: Low