

Subject Code: 1ET4010402	Subject Title: Advanced Surveying
Pre-Requisite	----

RATIONALE:

Field survey is the basic requirement for preparing any engineering maps or drawings. Field survey can be professionally carried out only when various steps involved in the survey work are known with skills of operating modern survey equipment. At diploma level, students are expected to study about these aspects so as to develop their understanding, performance oriented abilities in order to apply their knowledge in construction industry.

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 Traverse Survey. 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, prolong a line, ranging a line. 1.7 Theodolite traversing and closing error.	10	25

	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.		
2	Trigonometric Levelling. 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. 2.5. Related examples using all methods.	06	15
3	Tacheometry Survey. 3.1 Introduction. 3.2 Purpose and Principles of tacheometric surveying. 3.3 Instruments used in Tacheometry. 3.4 Theory of Stadia Tacheometry. 3.5 Anallatic Lens, advantages & disadvantages. 3.6 Methods of determining constants of a Tacheometer. 3.7 Related examples on tacheometer constants. 3.8 Methods of Tacheometry (Stadia & Tangential). 3.9 Method of Fixed Hair : - When line of sight is horizontal and staff held vertically - When line of sight is inclined and staff held vertically (Angle of Elevation & Depression). 3.10 Advantages and disadvantages of Tangential method 3.11 Related examples of Tacheometer using all methods.	10	25
4	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. 4.7. Related examples of curves.	08	20
5	Advanced Survey Equipments. 5.1. Introduction. 5.2. Basics of Digital Theodolite EDM and Total Station. 5.3. Parts and Set up of Total Station. 5.4. Surveying using Total Station. 5.5. Total Survey system error Sources and how to avoid	08	15

	them.		
	5.6. Fundamentals of GPS and its Uses.		
	5.7. GPS Receivers and Field procedures of GPS.		
	5.8. Observations and applications in Civil Engineering.		

COURSE OUTCOME:

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

1. Use Theodolite for the measurement of horizontal and vertical angle.
2. Calculate the height of objects through a trigonometrically levelling.
3. Find distances and elevations using Tachometer.
4. Prepare survey maps/drawing after carrying out different kinds of field surveys using advance surveying equipments.

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.
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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. Surveying and levelling Vol – 1 and 2 - By T. P. Kanetkar & S. V. Kulkarni - Puna Vidyarthi Griha Prakashan.
5. Survey I and Survey II - By S. K. Duggal, - Tata McGraw Hill Education Pvt. Ltd., Noida.
6. Surveying and Levelling Vol-I & II - S.K.Hussain, M.S. Nagaraj - S. Chand and Co.
7. CD Programme on Total Station and GPS - Learning Materials Development Project - Taramani, Chennai NITTTR, Bhopal.