5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I **Theodolite**	1a. Explain the basic function of different parts theodolite. 1b. Operate theodolite and read horizontal and vertical angle. 1c. Determine the altitude and departure of given points on the ground.	1.1 Introduction to theodolite 1.2 Uses of theodolite 1.3 Sketch and parts of Transit Vernier theodolite 1.4 Reading of main and vernier scale on horizontal and vertical plate 1.5 Temporary adjustment of a theodolite 1.6 Permanent adjustment of theodolite (Fundamental axis of theodolite and their relationship) 1.7 Definitions and various technical terms 1.8 Methods of measuring horizontal angles and vertical angles 1.9 Use theodolite for measuring a magnetic bearing, prolong a line, ranging a line 1.10 Measuring direct and deflection angles 1.11 Errors in theodolite work 1.12 Theodolite Traversing 1.13 Traverse computations 1.14 Closing errors, Balancing the traverse 1.15 Gale's Traverse Table 1.16 Related examples
Unit – II **Trigonometrical Levelling**	2a. Determine relative elevations and angular measurements for given different conditions of instruments. 2b. Calculate the height of objects through a trigonometrical levelling.	2.1 Introduction 2.2 Methods of observations (Direct and Reciprocal) 2.3 Methods of determining the elevation of a particular point 2.4 when base of the object is accessible 2.5 when base of the object is inaccessible 2.6 Related examples using all methods
Unit – III **Tacheometry**	3a. Explain the principles and various methodologies involved in techeometry. 3b. Calculate R.L. and horizontal distance	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

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
	between object and instruments.	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.
Unit – IV **Curves**	4a. Describe different elements of curves. 4b. Calculate necessary data required to setting out curve on field.	4.1 Introduction 4.2 Types of circular curves 4.3 Definitions and notations 4.4 Designation of curve 4.5 Relation between Radius and degree of curve 4.6 Elements of simple circular curve 4.7 Setting out simple circular curve 4.8 Methods of setting out simple circular curves 4.9 Transition curves - Requirements and purpose of it. 4.10 Vertical curves 4.11 Related examples of curves.
Unit – V **Advanced Survey Equipments**	5a. Explain the principles of total station. 5b. Record data on total station as well as on computer. 5c. Retrieving the data and generate the drawings using application software.	5.1 Introduction 5.2 Basics of Digital Theodolite 5.3 Introduction and Principles of E.D.M. 5.4 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 5.5 Surveying using Total Station - Flow chart of data collection - Fundamental Parameters of Total Station 5.6 Precautions to be taken while using Total Station 5.7 Field equipments 5.8 Set up of Total Station

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
		- Centering, Levelling , back-sight, Azimuth Marks 5.9 Measurement with Total Station 5.10 Total Station Initial Setting 5.11 Field Book recording 5.12 Radial Shooting 5.13 Total Station Traversing 5.14 Survey Station description 5.15 Occupied Point Entries 5.16 Data Retrieval 5.17 Field Generated Graphics 5.18 Construction layout using Total Station 5.19 Overview of Computerized Survey Data System 5.20 Equipment Maintenance 5.21 Maintaining Battery Power 5.22 Total Station Job Planning and Estimating 5.23 Total Survey system errors Sources and how to avoid them 5.24 Controlling errors

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Theodolite	12	05	05	11	21
2	Trigonometrical Levelling	06	02	02	05	09
3	Tacheometry	08	04	06	06	16
4	Curves	08	03	04	07	14
5	Advanced Survey Equipments	08	03	03	04	10
Total		42	17	20	33	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.