

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD,
GUJARAT**

COURSE CURRICULUM

**Course Title: Surveying & Levelling
(Code: 3335003)**

Diploma Programme in which this course is offered	Semester in which offered
Architectural Assistantship	Third

1. Rationale

It is essential for students to have information of the field and its topography to prepare maps or drawings; for any civil or architectural work. This course will help the students to get familiar with the various surveying instruments and will help improving the understanding of topography of building site. This course will provide an opportunity to develop skills of surveying at primary level.

2. Competency

The course contented should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competencies:

- 1. Carry out field survey and prepare required drawings and maps.**
- 2. Interpret the drawings, contour maps, etc.**

3. Teaching and Examination Scheme

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	150
2	0	2	4	70	30	0	50	

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** - Practical; **C** - Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

4. Detailed Course Content

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I Introduction	1a. Explain the basics of surveying. 1b. Use scales as per requirements	1.1 Objective and uses of surveying 1.2 Classification of Survey 1.3 Principles of Survey 1.4 Types of Scale and selection of scale 1.5 Construction of diagonal scale.
Unit – II Chain and tape Survey	2a. Perform linear measurements using simple tools and equipments. 2b. Prepare drawing as per recorded measurements.	2.1 Instruments used in chain and tape survey Metric Chain, Tapes, Arrow, Tapes, Ranging rod, Offset rod, Open cross staff, optical square 2.2 Technical terms related with chain survey. Survey Station, Base line, Check line, Tie line, Offset, Tie station 2.3 Methods of chaining 2.4 Errors in chain survey 2.5 Obstacles in chaining 2.6 Ranging 2.7 Recording measurements in a field book
Unit – III Compass Survey	3a. Perform angular measurements using appropriate compass. 3b. Prepare drawing as per recorded measurements.	3.1 Introduction Survey & Traversing 3.2 Components and functions of Prismatic Compass 3.3 Technical Terms - True Meridian & Bearing, - Magnetic Meridian & Bearing, - Arbitrary Meridian & Bearing, - Dip of Magnetic needle - Declination - Fore Bearing & Back Bearing, WCB, RB 3.4 Method of finding included angles from bearings - examples 3.5 Local attraction and Closing error with relevant examples 3.6 Errors and its elimination
Unit – IV Levelling	4a. Use levels for surveying application. 4b. Prepare contour maps by calculating Reduce level.	4.1 Introduction 4.2 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, Focusing and parallax, etc. 4.3 Dumpy Level & Automatic Level - Components and their functions - Temporary adjustment of Level 4.4 Levelling Staff Folding and Telescopic staff 4.5 Examples & methods of finding out the R. L. in Level Book by H.I. Methods & Rise & Fall Methods 4.6 Contour and uses of contours • Characteristics of contours • Methods of Contouring • Interpolation of contours

5. 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	Introduction	04	02	02	03	07
2	Chain Survey	04	02	06	06	14
3	Compass Survey	08	04	08	09	21
4	Levelling	12	04	10	14	28
Total		28	10	28	32	70

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

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

6. SUGGESTED LIST OF EXERCISES/PRACTICAL

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

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

S. No.	Unit No.	Practical/Exercise	Approx. Hrs. Required
1	I	Demonstrate the uses of Survey tools and equipment	06
2	II	Carry out the surveying project on given site to locate surrounding features using Chain and Compass	08
3	III	Carry out levelling project on an undulating ground and prepare the drawing sheet showing ground profile and contours of site.	14
Total			28

7. SUGGESTED STUDENT ACTIVITIES

Visit the nearby PWD/Irrigation/Public Health Department Offices and collect drawings/data for surveying the locations.

8. SUGGESTED LEARNING

RESOURCES (A) List of Books:

S. No.	Title of Books	Author	Publication
1	Surveying and levelling Vol-I	T. P. Kanetkar & S. V. Kulkarni	Puna Vidyarthi Griha Prakashan
2	Surveying and Levelling Vol-I	Dr. B. C. Punmia	Laxmi Publications Pvt. Ltd.

(B) List of Major Equipment/Materials:

Metric Chain, Tapes, Open Cross staff, Optical Square, Prismatic Compass, Surveyor's Compass, Dumpy Level, Levelling Staff and other misc. equipments, etc.

(C) List of Software/Learning Websites

<http://landsurveyorsunited.com>

9. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- (1) Prof. Sonal M. Jain, Government Polytechnic, Vadnagar
- (2) Prof. P.A.Pandya, Government Polytechnic, Himmatnagar
- (3) Prof. Abhijit R. Rathod, Government Polytechnic for Girls, Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

- Dr. A.K.Jain, Professor, Department of Civil & Environmental Engineering
- Dr. V.H.Radhakrishnan, Professor, Department of Civil & Environmental Engineering