

LOK JAGRUTI UNIVERSITY (LJU)

INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Civil Engineering (709)

Bachelor of Engineering (B.E.) Semester – I

Course Code:	017092101
Course Name:	Basic Civil Engineering
Category of Course:	Engineering Science Course (ESC)
Prerequisite Course:	---

Teaching Scheme				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Total Hours
4	0	2	5	40

Syllabus				
Unit No.	Topic	Prerequisite Topic	Successive Topic	Teaching Hours
01	Introduction to Civil Engineering			3 (7.5%)
	1.1 Introduction- branches, scopes	---	Sources of Water (017093504 - Unit-1)	
	1.2 Impact, role of Civil Engineers			
Basic Introduction to Surveying and Linear Measurements				6 (15%)
2.1 Introduction- technical terms, objectives, fundamental principle of surveying	---	Plane Table Surveying (017093404 - Unit-1), Geodetic Surveying (017093404 - Unit-7), Application of Surveying in Construction(017093404 - Unit-10)Theodolite Surveying(017093404 - Unit-2)Computation of Area and Volume(017093404 - Unit-06)		
2.2 Classification of surveying and application of surveying				
2.3 Methods of linear measurements and instruments used in linear measurement				
2.4 Chain Survey, Chaining on Plane Ground, Ranging & Offsetting				
2.5 Instruments Used for Setting out the Right Angles and Examples of Errors in Chaining				
03	Angular Measurements			4 (10%)
	3.1 Introduction to angular measurements	Basic Introduction to Surveying and Linear Measurements (017092101 - Unit-2)	Theodolite Surveying (017093404 - Unit-2)	
	3.2 Compass- instrument			
3.3 Types of meridians, Types of bearings. Traverse survey using with compass				
04	Levelling in Surveying			4 (10%)
	4.1 Leveling - definitions - computation of reduced levels	Basic Introduction to Surveying and Linear Measurements (017092101 - Unit-2), Angular Measurements (017092101 - Unit-3)	Trigonometric Levelling (017093404 - Unit-3) Tacheometric Surveying (017093404 - Unit-4) House Drainage as per NBC-2016 (017093603 - Unit-2) Sewer Appurtenances, Laying and Testing (017093603 - Unit-4)	
	4.2 Methods of leveling and examples on levelling			
4.3 Introduction to contours				
05	Construction Materials			4 (10%)
	5.1 Basic materials and its uses – cement, aggregate, brick, plastic and stone	---	Concrete making Materials (017093401-Unit -2) Specifications (017093602 - Unit-6), Rate Analysis: Introduction, SOR, Task Work, Productivity and Market Survey (017093602 - Unit-7), Rate Analysis: Material Quantity Analysis, Numerical Based on Rate Analysis (017093602 - Unit-8) Highway Materials: Subgrade Soil-Aggregate (017093502- Unit- 5)	
	5.2 Outline of concrete, mortar and steel			
	5.3 Elementary introduction to copper slag, steel slag and epoxy			
5.4 Fly ash and smart materials				
06	Classification of Buildings			3 (7.5%)
	6.1 Classification of buildings-based on structures, based on occupancy, based on use	---	Building Planning: Introduction (017093403 - Unit-1), Design and Drawing of Residential and Public Building (017093403 - Unit-5), Sub Surface Investigation (017093304 - Unit-1)	
	6.2 Types of residential buildings			
6.3 Introduction to building components				
07	Building Components- Door, Window, Stair and Stair Cases			4 (10%)
	7.1 Doors and Windows- location, technical terms, size, types construction, factors affecting selection of size, shape, location	---	Quantity Estimation- Load Bearing Structure (017093602 - Unit-3), Quantity Estimation- Frame Structure (017093602 - Unit-4)	
7.2 Stairs and Staircases- definitions, technical terms, requirements of good stairs fixing of going and rise of a step, types of steps, classification				

08	Building Components- Roof, Floors, Special Treatments			4 (10%)
	8.1 Floorings- introduction, essential requirements of floor, factors affecting selection of flooring materials, types of ground floors and upper floor.	---	Special Works: Diaphragm Wall Construction, Demolition of Structure (017093304 – Unit-6), Quantity Estimation- Load Bearing Structure (017093602 - Unit-3), Quantity Estimation- Frame Structure (017093602 - Unit-4), Rate Analysis: Material Quantity Analysis, Numerical Based on Rate Analysis (017093602 - Unit-8) Water Supply in Building and Plumbing (017093504 - Unit-10)	
	8.2 Roofs and roof coverings- introduction, requirements of roofs, classification technical terms, types of roof coverings for pitched roofs			
	8.3 Overview of Special Treatments – Fire Resistant – Introduction, Causes of Fire, Fire Hazards & Types, Fire Load & Grading, Characteristics of Fire Resisting Materials, Fire Resisting Properties of Common Building Materials Water Resistance – Introduction, Reasons & Preventive Measures for Water Leakage, Water Proofing of Flat Roofs Thermal Insulation – Introduction, Advantages, Types of Thermal Insulating Materials, Choice of Insulating Material Acoustical Construction – Introduction, Requirements of Good Acoustic Materials, Types of Absorbent Materials Anti-Termite Treatment – Introduction, Types of Termites & Types of Anti-Termite Treatment			
Masonry Construction				
09	9.1 Stone masonry- technical terms, joints and classification of stone masonry	Construction Materials (017092101 - Unit-5)	Design and Drawing of Residential and Public Building (017093403-Unit-5), Quantity Estimation- Load Bearing Structure (017093602 - Unit-3), Quantity Estimation- Frame Structure (017093602 - Unit-4), Rate Analysis: Material Quantity Analysis, Numerical Based on Rate Analysis (017093602 - Unit-8)	5 (12.5%)
	9.2 Brick masonry- technical terms, bonds in brick work.			
	9.3 Other masonry- composite masonry, hollow block masonry- technical terms, types and construction			
	9.4 Lintels and Arches- types, construction			
	9.5 Overview of Wall Finishes Plastering – Introduction, Objects, Requirements of Good plastering, Types of Mortars for Plastering, Overview of Methods of Plastering, Types of Plaster Finishes, Overview of Defects in Plastering Pointing – Introduction, Mortars for Pointing, Preparation of Surface for Pointing, Types of Pointing Painting – Introduction, Characteristics of an Ideal Paint, Information Required Before Painting, Constituents, Classification, Overview of Defects in Painting			
10	Advancements in Civil Engineering			3 (7.5%)
	10.1 Outline of Solid Waste Management, smart city's	---	---	
	10.2 Energy efficient building- green buildings			
	10.3 Development of river fronts and heritage importance			
10.4 Features of earthquake resistant structures				

Sr No.	Practical Title	Link to Theory Syllabus
1	Survey of an area by Chain Survey (Closed Traverse) & plotting the same in survey book.	Unit-2
2	Survey a given area by Compass Survey using Prismatic & Surveyor's Compass.	Unit-3
3	Profile Levelling of a given area using Dumpy Level.	Unit-4
4	Prepare one cement concrete block based on given proportion of materials.	Unit-5
5	Prepare one cement mortar block based on given proportion of materials.	Unit-5
6	Differentiate fine aggregate and coarse aggregate by sieve analysis.	Unit-5
7	Explain different types of doors & windows from their models.	Unit-7
8	Construct brick masonry wall with English Bond & Flemish Bond.	Unit-9

Major Components/ Equipment	
Sr. No.	Component/Equipment
1	Concrete Block Moulds of Size 150 mm x 150 mm x 150 mm
2	Mortar Block Moulds of Size 70.6 mm x 70.6 mm x 70.6 mm
3	Trowel
4	Vibrator
5	Head Pan
6	Hand Gloves
7	Weighing Scale
8	Sieves of size 4.75 mm, 10 mm, 20 mm
9	20 m & 30 m Metallic Chain
10	20 m Tape

11	Pegs
12	Arrows
13	Plumb bob
14	Ranging Rod
15	Offset Rod
16	Line Ranger
17	Prismatic Compass
18	Surveyor's Compass
19	Tripod for Compass
20	Dumpy Level
21	Tripod for Dumpy Level
22	Levelling Staff
23	Sliding Door
24	Swing Door
25	Glazed & Sash Door
26	Frame & Braced Door
27	Collapsible Door
28	Framed & Panelled Door
27	Sliding Window
28	Revolving Door
29	Pivoted Window
30	Louvered or Ventilated Window
31	Sky Lights
32	Bay Window
33	Corner Window
34	Dormer Window
35	Gable Window
36	Glazed & Sash Window
37	Metal Window
38	Clerestory Window
39	Casement Window
40	Battened & Ledged & Braced Door
41	Fixed Window
42	Flushed Door
43	Rolling Door

**Proposed Theory + Practical Evaluation Scheme by Academicians
(% Weightage Category Wise and it's Marks Distribution)**

L: 4 T: 0 P: 2

**Note: In Theory Group, Total 4 Test (T1+T2+T3+T4) will be conducted for each subject.
Each Test will be of 25 Marks.
Each Test Syllabus Weightage: Range should be 20% - 30%**

Group (Theory or Practical)	Group (Theory or Practical) Credit	Total Subject Credit	Category	% Weightage	Marks Weightage	
Theory	4	5	MCQ	48%	60	
Theory			Theory Descriptive	16%	20	
Theory			Formulas and Derivation	0%	0	
Theory			Numerical	16%	20	
Expected Theory %	80%			Calculated Theory %	80%	100
Practical	1		Individual Project	0%	0	
Practical			Group Project	6%	30	
Practical			Internal Practical Evaluation (IPE)	10%	50	
Practical			Viva	4%	20	
Practical			Seminar	0%	0	
Expected Practical %	20%		Calculated Practical %	20%	100	
Overall %	100%			100%	200	

Course Outcome

	<i>Upon completion of the course students will be able to</i>
CO1	Explore civil engineering branches and surveying principles for accurate measurements.
CO2	Analyze meridian bearings and performing calculations of direction angles and contouring using surveying equipment, including leveling instruments.
CO3	Gain an understanding of materials used in construction and perform classification of buildings based on their structural components.
CO4	Learn about building components, treatments, and modern civil engineering trends.

Suggested Reference Books

1	Building Construction, S.C.Rangwala, Charotar Publication
2	Building Construction, Dr. B. C. Punmia, Er. Ashokkumar Jain, Dr. Arunkumar Jain, Laxmi Publication Delhi
3	Basic Civil Engineering, S. Ramamrutham, Dhanpatrai Publication
4	Engineering Material, S.C. Rangwala, Charotar Publication
5	Surveying Vol. I, Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain, Laxmi Publication Delhi
6	Surveying and Leveling, R. Subramanian, Oxford University
7	Basic Civil Engineering, Satheesh Gopi, Pearson Publisher

List of Open Source Software/Learning website

1	https://nptel.ac.in
2	https://nptel.ac.in/courses/105/106/105106201/

Practical Project/Hands on Project

Sr. No.	Project List	Linked with Unit
1	Prepare a plan of a given area with chain survey & compass survey & also find out its area.	Unit 2,3
2	Explore a construction site and prepare summary of construction project with project details. (Students have to approach any construction site and prepare a brief document containing project details, Components used, Methods of construction, Material list, etc.)	Unit 1,5
3	Do market survey of various types of civil engineering materials with their samples & rates.	Unit 5
4	Prepare a Model of Load Bearing Structure showing its components.	Unit 6
5	Prepare a Model of Framed Structure showing its components.	Unit 6
6	Do market survey of materials/methods for fire resistance, water resistance, thermal insulation, acoustical construction and anti-termite treatment.	Unit 8