



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering

Level: UG

Branch: ALL

Course / Subject Code: BE01000101

Course / Subject Name: Basic Civil Engineering

w. e. f. Academic Year:	2024-25
Semester/Year	I st Year
Category of the Course:	ESC

Prerequisite:	NA
Rationale:	Infrastructure development has been the main focus area for developing country like India. Housing, Road, bridges, public transportation systems and sanitation can be considered as indicators for development of the country. In view of this, it is essential for all engineering graduates to know the basic aspects of civil engineering. This subject deals with planning and construction of building, construction materials, surveying, quality parameters of water and wastewater, water shed management and overview of other infrastructural needs of a city.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Apply the basic knowledge of different building materials used in construction.	U
02	Interpret plans, components and methods of construction for the building.	A
03	Identify quality of water and wastewater and methods of water conservation.	U
04	Know the use of basic equipment required for linear and angular measurements	A
05	Comprehend need and types of mass transportation systems and advances in civil engineering.	U

*Revised Bloom's Taxonomy (RBT)

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150



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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction of Civil Engineering and Building materials: Introduction, branches of civil engineering, scope, role of a civil engineer, units of measurements and its conversion. Type, properties and applicability of building materials: cement, aggregate, brick, steel, concrete, stone, soil, mortar, timber, plastic, epoxy, fly-ash, metal slags, bitumen, optical fiber, pipes, wires and cables, FRP and emerging smart and recycled materials.	7	16
2.	Building planning and construction: Definitions of terminologies related to building plan, working drawings, principles of planning, types of building, preparation of plan elevation and section of a residential building, symbols used for electrical and sanitary services, building components and its functions, loads acting on the building, elementary concepts of brick and stone masonry. Town planning, necessity and principles, Origin of town, Growth of town, Land use, Principles and objects of zoning, Advantages of zoning, Low-cost housing, Building automation	12	27
3.	Quality parameters of water and wastewater and sanitary systems Sources of water, quality characteristics of drinking water and domestic wastewater, drinking water standards, methods for disposal of wastewater, types of sewerage system, types of building services like plumbing & sanitation, water supply & drainage system, house drainage system, elementary concepts of solid waste management.	8	17
4.	Introduction to surveying and levelling: Introduction to surveying, fundamental principles, classification. Linear measurement: Instruments used, chaining on plane ground, offset, ranging. Angular measurement: Types of compass, meridian and bearing, local attraction, traverse surveying. Leveling: Instrument used, terminology, types of leveling, methods of leveling, contours and its characteristics. Modern tools: Introduction to theodolite, auto-level, total-station, EDM. Introduction to GPS survey and Drone survey	12	27
5.	Advances in Civil Engineering Smart city and its features, green building, earthquake resistant structures, mass transportation systems (BRTS, metro, mono rail.), bullet train, watershed management, Sardar Sarovar dam, Kalpsar	6	13



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	project, Narmada canal network, Water conservation, and rain water harvesting, river front development		
	Total	45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
35	40	25	-	-	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Surveying volume I and II by Dr. B.C. Punmia, Laxmi Publications.
2. Surveying and levelling by N.N. Basak, Tata Mcgraw Hill Education.
3. Building Construction by Dr. B.C. Punmia, Laxmi Publications.
4. Engineering Materials by R.C. Rangwala, Charotar Publications.
5. Building planning, designing and scheduling by Gurucharan Singh, Standard Publisher.
6. Environmental Engineering volume I and II by S.K.Garg, Khanna Publishers.
7. Basic Civil Engineering by S. Ramamrutham, Dhanpatrai Publication.
8. Basic Civil Engineering by M.S.Palanichamy, McGraw Hill
9. Basic Civil Engineering by Satheesh Gopi, Pearson Publisher

(b) Open source software and website:

1. <http://nptel.ac.in/courses/105107122/>
2. <http://nptel.ac.in/courses/105107157/>
3. <http://nptel.ac.in/courses/105101087/>
4. <http://nptel.ac.in/courses/105104100/>

Suggested Course Practical/Assignment List:

1. Unit conversation exercise.
2. Assignment based on building material and field visit for material identification.
3. Identification of components of building (field visit/models) and assignment related to it.
4. Planning of a residential building (plan, elevation & section of a residential building)



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5. Linear and angular measurements (Chain and Compass) (in field with instrument)
6. Determination of R.L of a given point by Dumpy level/auto-level. (in field with instrument)
7. Assignment based on numerical of surveying and levelling.
7. Introduction to Theodolite & total station.
8. Presentation on BRTS/Metro/Monorail/Bullet train.
9. Seminar on green building & smart city.

List of Laboratory/Learning Resources Required:

Chain, tape, compass, dumpy level, auto-level, theodolite, total station, EDM, models related to building components and services.

Suggested Project List:

1. Chain and Compass Traverse Survey
2. Profile leveling

Suggested Activities for Students:

Explore web content related to smart cities, green building, mass transportations systems, emerging building materials etc.

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