



# GUJARAT TECHNOLOGICAL UNIVERSITY

Minor Degree: Infrastructure Engineering

Subject Code: N114AE01

Semester – IV (w.e.f. AY 2024-25)

Subject Name: Building Services

**Type of course:** Professional Core Subject

**Prerequisite:** Nil

**Rationale:** Utilities for Civil Infrastructure is providing conceptual understanding and applications of variety of utilities required for infrastructure projects.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
4	0	2	5	70	0	30	0	100

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Plumbing work:</b> water supply and sanitary provisions, Accessories of sanitary provision, methods of plumbing, problems associated with plumbing work. Design considerations for Water piping systems in Buildings	08
2	<b>Electrical and Allied Installations:</b> Day lighting, basic design, artificial lighting. Different types of wiring, need of earthing, comparison between fuse and MCB, substation, types of lightning fixtures, electricity distribution in multi-storeyed building. Building protection against lightening, Planning and layout of electrical installations within a building complex.	08
3	<b>Air Conditioning:</b> Requirement of air conditioning, air conditioning system, elements of air conditioning, Working and P-H diagram of vapour compression cycle, refrigeration effect. <b>Mechanical Ventilation of Buildings:</b> Indoor Air Quality, Natural Ventilation vs. Infiltration, Air Distribution patters, Duct System types for buildings, Basic principles of Air flow in Ducts, Duct sizing, Duct deign methods,	10
4	<b>Firefighting and safety measures:</b> Planning considerations in buildings using non-combustible materials, escapes, Fire detection and firefighting systems. Heat and smoke detectors, Fire alarm system, Automatic sprinklers.	08
5	<b>Mechanical Equipment &amp; Installation:</b> Installation of lifts and escalators, different types of Security and alarm systems. Hot Water Provision (Solar and Electrical), Special features required for physically handicapped and elderly	08



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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	25	25	10	0

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

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

### Reference Books:

1. David V Chadderton , 'Building Services Engineering', Routledge, ISBN-10:9780415699327ISBN-13:978-0415699327,Sixth edition, (2012).
2. IS SP 41 (S & T): Handbook on Functional Requirements of Buildings (Other Than Industrial Buildings) (Part 1 -4)', BIS,ISBN-10:8170610117, ISBN-13:978-8170610113, First edition, (1987)
3. Ahmadul Ameen, Refrigeration and Air Conditioning, Publisher: Prentice-hall of India
4. Walter T. Grondzik, Alison G. Kwok, Mechanical and Electrical Equipment for Buildings, Publisher: John Wiley & Sons.
5. S. Sivanagaraju, "Generation and Utilization of Electrical Energy", Pearson

### Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Analyse building services of water supply, sanitation and their integration with architectural design.	20
CO-2	Know various electrical utility requirements in Building	30
CO-3	Sizing and designing adequate mechanical utilities in civil infrastructure	30
CO-4	Identify effective measures for fire proofing, damp proofing and thermal insulation	20

### List of Experiments:

- Water Supply plumbing system design for a High Rise building/ Township design
- Model development of house wiring
- Sizing and designing of cooling system for the building
- Sizing and designing of air distribution duct
- Designing of firefighting system for multi storied building