



GUJARAT TECHNOLOGICAL UNIVERSITY

Minor Degree: Infrastructure Engineering

Subject Code: 114AE01

Semester – IV

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	Plumbing work: 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	Electrical and Allied Installations: Day lighting, basic design, artificial lighting. Different types of wiring, need of earthing, comparison between fuse and MCB, substation, types of lightening fixtures, electricity distribution in multi-storeyed building. Building protection against lightening, Planning and layout of electrical installations within a building complex.	08
3	Air Conditioning: Requirement of air conditioning, air conditioning system, elements of air conditioning, Working and P-H diagram of vapour compression cycle, refrigeration effect. Mechanical Ventilation of Buildings: 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	Firefighting and safety measures: 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	Mechanical Equipment & Installation: 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