Lok Jagruti Kendra University
University with a Difference

Diploma in Architectural Assistantship

LJ Polytechnic

Course Code:025080402

Building Services

Programme / Branch Name			Diploma in Architectural Assistantship			
Course Name	Building Services				**Course Code**	025080402
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	2	4	50	50	50	150

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Building Construction
- ✓ Design Studio 1

3. Rationale

This course focuses on students' acquisition of knowledge, skills & practices of essential building services for proper functioning & utility of building as a 'whole' unit/entity. Knowledge about domestic water supply & sanitation systems (external & internal) and house drainage & disposal facilities, ventilation and air conditioning, acoustics, and creation of movement provisions is imparted. The knowledge and application of such aspects of the building are essential in developing a good architectural assistant who can be useful in creating good functional buildings with the right kind of building services requiring least and easy maintenance.

4. Objectives

- ✓ Plan buildings applying knowledge of essential building services for effective & efficient functioning of buildings.
- ✓ Identify various sources, uses of water, demand of water and factors affecting the rate of demand, and distribution of water for any city/colony/campus.
- ✓ Develop basic & functional understanding of various kinds of provisions of air conditioning system and movement facilities like ramps, lifts and escalators.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1.	**Domestic Water Supply**	1.1. Quality of Water 1.1.1. Rate of Demand 1.1.2. Factors Affecting Rate of Demand for Water 1.1.3. Variation in Rate of Demand 1.1.4. Types of Sources of Water Supply Schemes 1.2. Distribution System of Water 1.2.1. Methods of Distribution of Water 1.2.2. Systems of Supply of Water 1.2.3. Methods of the Layout of Distribution Pipes 1.3. Pipe Appurtenances 1.3.1. Necessity 1.3.2. Air Valves 1.3.3. Bib Cocks 1.3.4. Fire Hydrant 1.3.5. Reflux Valves 1.3.6. Relief Valves 1.3.7. Sluice Valves 1.3.8. Scour Valves 1.3.9. Water Meters 1.3.10. Simple Layout of the Water Supply System for a Residence	• Enlist Various Sources of Water and Uses of Water. • Calculate the Demand of Water for Domestic Purposes. • Explain the Factors Affecting the Rate of Demand of Water. • Explain Various Methods of Water Distribution and Layout of Distribution Pipes With a Sketch. • Explain Various Water Supply System • Explain Various Water Supply Fittings, Fixtures, and Pipes. Draw Layout of The Water Supply System for a Residence.	15	8
2.	**Sanitation and House Drainage**	2.1. Purpose of Sanitation 2.1.1. Principles of Sanitation 2.1.2. Some Definitions 2.1.3. Systems of Sewerage 2.2. Drop Manholes 2.3. Manholes 2.4. Principles of House Drainage 2.5. Traps 2.6. Some Definitions	• Explain the Various System of Plumbing & Sanitary Fittings • Draw Drainage Plan of A Building. • Explain the Septic Tank, Soak Pit, and Manholes with a Sketch.	30	12

		2.7. Sanitary Fittings 2.8. System of Plumbing 2.9. Drainage Plans of Buildings 2.10. Maintenance of House Drainage System 2.11. Septic Tanks			
3.	**Ventilation and Air Conditioning**	3.1. Necessity of Ventilation 3.2. Factors Affecting Ventilation 3.3. Requirements of A Good Ventilation System 3.4. Types of Ventilation 3.5. Air-conditioning 3.6. Defination of Air-conditioning 3.7. Purposes of Air-conditioning 3.8. Filters for Air-conditioning 3.9. Heating, Cooling, Humidification, Dehumidification 3.10. Summer & Winter Air-conditioning 3.11. Air Distribution 3.12. System of Air-conditioning	• Define Ventilation and Its Necessity. Explain the Functional Requirements and Essentials of a Good Ventilation System. Describe the System of Ventilation. • Define Air Conditioning and the Purpose and Classification of Air Conditioning. • Explain the Principles of Comfort Air Conditioning. • Describe the System of Air Conditioning with a Sketch.	24	9
4.	**Acoustics & Fire Protection**	4.1. General 4.2. Frequency and Intensity of Sound 4.3. Sound in Enclosures 4.4. Reflection of Sound 4.5. Defects Due to Sound 4.6. Reflected Absorption of Sound 4.7. Absorbent Materials 4.8. Types of Absorbent Materials 4.9. Factors to be Consider in the Acoustic Design of Auditorium 4.10. Defects in an Auditorium and Their Remedies 4.11. Causes and Effects of Fire 4.12. Fire Resisting Properties of Common Building Materials	• List out and Explain Characteristics of Audible Sound • Explain Various Acoustical Defects. • Define Insufficient Loudness and External Noise. • Classify Various Sound Absorbent Materials and Explain Them. • Explain the Required Conditions of Good Acoustics. • Explain General Principles in Acoustical Design.	21	10

		4.13. Fire Protection Systems			
5.	**Movement Facilities**	5.1. Electrical Lifts, Lift Wall, Lift Door and Gates and Their Detail With a Sketch. 5.2. Moving Stairs 5.3. Ramps	• Explain Electrical Lifts along with Their Parts with a Sketch. • Describe What is an Escalator, Its Types, Space Required, and Approaches. • Explain Ramps for Different Purposes	10	3
				Total Hours	**42**

6. List of Practicals / Exercises

The practicals/exercises have been properly designed and implemented in an attempt to develop different types of skills, so that students can acquire the competencies/programme outcomes. Following is the list of practicals/exercises.

Sr. No	Practical / Exercises	Key Competency	Hours
1	Draw scheme for water supply for a given building.	Draw and interpret the water supply plan of a building.	6
2	Draw detailed scheme for house drainage and sanitary fixtures for a given building	Draw and interpret the drainage plan of a building.	6
3	Plan and draw in detail ventilation and air-conditioning for a given building.	Plan comfortable and functional buildings applying principles of ventilation.	4
4	Design acoustics for a given building.	Plan comfortable and functional buildings applying principles of acoustics.	6
5	Plan movement facilities: lifts, escalators, ramps, etc. for a given public building	Plan buildings applying knowledge of essential building services for effective & efficient functioning of buildings.	6
		Total Hours	28

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Domestic Water Supply	10	50	40	-	-	-
2	Sanitation and House Drainage	10	40	40	-	-	-
3	Ventilation and Air Conditioning	10	60	25	05	-	-
4	Acoustics & Fire Protection	02	40	40	09	-	-
5	Movement Facilities	10	40	40	10	-	-

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Textbooks

1. Water supply and sanitary Engineering by S.C. Rangwala, Charotar Publications
2. Building Construction by Rangwala, Charotar Publications

9. Reference Books

3. Building Construction by S.P Arora & Bindra, Dhanpatrai Publications
4. Building Construction by Gurucharan Singh, Rajsons Publications
5. Water supply and sanitary Engineering by Gurucharan Singh & Jagdish Singh, Standard Publishers
6. Water supply and sanitary Engineering by G.J.Kulkarni, Ahmedabad Book Depot
7. Building Services and Equipment by Frederick E. Hall, Longman Scientific, and Technical

10. Open Sources (Website, Video, Movie)

1) www.niagarafalls.ca/pdf/building/installation-of-plumbing.pdf
2) www.level.org.nz/water/water-supply/system-layout-and-pipework
3) en.wikipedia.org/wiki/HVAC
4) www.otis.com/site/in/pages/AboutElevators.aspx menu =2
5) www.epa.gov/ia /schooldesign/hvac.html
6) en.wikipedia.org/wiki/Elevator
7) https://www.youtube.com/playlist?list=PLcWeCCSvXbNns6-VjthgfBbSlzMhbtbSD