Department of Architectural Engineering

College of Engineering

University of Cihan- Sulaimaniya

Subject: Building Services III

Course Book – Year 2025

Lecturer's name: Asst. Lect. Nadia Allami

Academic Year: 2025 - 2026

Course Book

1. Course name	**Building Services III**
2. Lecturer in charge	**Asst.Lect. Nadia Allami**
3. Department/ College	**Architectural Engineering**
4. Time (in hours) per week	**2 hours Sunday 11:00-13:00**
5. Office hours	**2 hours**
6. Course code	
7. Teacher's academic profile	**https://uni.sulicihan.edu.krd/qa/profile.php?id=251**
8. Keywords	**Building Services, Invisible Architecture, HVAC, Lighting, Daylighting, Vertical Transportation, Waste Management, Service Spaces, Spatial Coordination, Sustainability**

9. Course overview:

This course provides a comprehensive introduction to the essential engineered systems and technologies (Building Services) required for modern, functional architecture. It covers Environmental Control (HVAC, Lighting), Public Health (Waste Management), Safety, and Transportation. The course emphasizes the concept of "Invisible Architecture" and the architect's crucial role as the integrator and coordinator of these performance-oriented systems with the structural shell.

10. Course objective:

The main objective is to enable students to understand the function, efficiency, and **spatial requirements** of major building services. Students will learn to perform preliminary selection and planning for Lighting, HVAC, and Vertical Transportation systems to ensure early design integration, leading to functional, aesthetic, and sustainable buildings.

11. Student's obligation

Students are obligated to attend all lectures, participate actively in class discussions, complete assigned readings, and submit all required assignments, quizzes, and project work on time.

12. Forms of teaching

Formal Lectures (supported by slides), Illustrated Discussions, Analysis of Case

Examples, Practical Tutorials (e.g., using Neufert for sizing).

13. Assessment scheme

Midterm Examination	**30 %**
Paper, Quiz, Project	**10%**
Lab exam	**00%**
Final Practical Examination	**00%**
Final theory exam	**60%**

14. Student learning outcome:

- **Select Cooling Systems:** Evaluate a building's needs and climate to select the most appropriate cooling system (Evaporative Air-Cooling vs. Refrigeration Air-Conditioning) and identify the architectural implications of various AC system types (Split, VRF, Package).
- **Plan Service Cores:** Determine the spatial requirements for vertical transportation (Lifts, Escalators) and public health systems (Waste Chutes).
- **Coordinate Services:** Identify and properly plan all critical service spaces (Plant Rooms, Vertical Shafts, Ceiling Voids) and manage coordination mistakes to ensure hidden yet accessible systems.

15. Course Reading List and References:

1. **Stein, B. and Reynolds, J.S., *Mechanical and Electrical Equipment for Buildings*. (Primary Text)**
2. **Neufert, E., *Architects' Data*. (For standards and sizing examples).**
3. **Relevant International Building Codes and Standards (e.g., ASHRAE, IES).**
4. **Lecture Slides provided by the instructor.**

16. The Topics:

Lecture No	Topic
1	**BUILDING SERVICES III Introduction:** The Role of Building Services, Categories, and The Architect as Integrator.
2	**LIGHTING:** Basic Concepts, Lighting Units (Lumen, Candela, Lux), and the Biological/Psychological Effects of Light.
3	**Day LIGHTING:** Orientation, Window Design Principles, Shading Devices, and Performance Metrics (Daylight Factor, Daylight Autonomy).

4	**Artificial LIGHTING:** Types of Lamps (Incandescent, Fluorescent, LEDs), Luminaires, Color Temperature, CRI, and Lux Standards.
5	**Sustainable LIGHTING:** Electrical Integration, Emergency & Exit Safety Lighting, Lighting Controls (Dimmers, Sensors), and Smart Lighting.
6	**Vertical Transportation:** Lifts/Elevators and Escalators—System Types, Functional Concepts, and Spatial Planning in Building Cores.
7	**Waste Management Systems** (Garbage Chutes, Fire Safety) & Introduction to **Evaporative Air-Cooling** Principles.
8	**Air-Cooling vs Air-Conditioning Systems:** Comparison of Principles, Pros & Cons, and System Selection Criteria based on Climate and Function.
9	**AC System Types:** Architectural Implications of Window, Split, Central Package, and VRF/VRV Systems.
10	**Service Spaces:** Types (Plant Rooms, Mechanical Floors, Vertical Shafts, Ceiling Voids), Spatial Planning Principles, and Coordination Mistakes.
11	Review and Case Study 1: Integration of Lighting and HVAC Systems in Different Building Types.
12	Project/Design Submission: Review of Initial Service Integration Schemes.
13	Review and Case Study 2: Core Design and Vertical Transportation/Shaft Sizing.
14	Final Review and Q&A Session.
Final Examination	Theory Exam covering all lecture topics (Lectures 1–10).

17. Peer review

Asst. Lect. Nadia Allami **Asst. Prof. Tara Azad**

Main Lecturer incharged **Head of The Department**