

**COURSE TITLE** : **BUILDING MAINTENANCE AND SERVICES**  
**COURSE CODE** : **5001**  
**COURSE CATEGORY** : **E**  
**PERIODS/WEEK** : **4**  
**PERIODS/SEMESTER** : **72**  
**CREDITS** : **4**

### TIME SCHEDULE

MODULE	TOPIC	PERIODS
I	Durability of buildings	18
II	Failure and repair of buildings	18
III	Maintenance of buildings	18
IV	Building services	18
	<b>TOTAL</b>	<b>72</b>

### Rationale

*The care and maintenance of building is very much essential for its durability. A Civil Engineer should be competent in far sighting the probable causes of deterioration and failures. Preventive measures should be taken to prevent that and upkeep the building in a serviceable condition.*

*Due to the advancement of science and technology many gadgets has been added to the building. For the comfortable living the use of these services should be available and reliable whenever the users want that. The Civil Engineers has to supervise the installation and service of these facilities. The students of Civil Engineering discipline have the basic awareness of different new generation building services and materials. The idea about the maintenance and service of building will very much helpful to the students in their career advancement.*

### OBJECTIVES

Up on completion of the course the student should be able:

- 1.1 To understand the healthy environment for a healthy building.
- 2.1. To understand the various causes of failures of buildings and their repairs.
- 3.1. To understand the various aspects and methods of building maintenance.
- 4.1. Plan and design water supply and sanitary arrangements required in residential and commercial buildings.
- 4.2 Acquire the basic knowledge of other building services like lifts, climate control systems, Electrical systems, communication lines gas pipes etc. to understand their functions and requirements

### COURSE CONTENT

#### **MODULE I: Durability of buildings**

Life expectancy of different types of buildings-effects of environmental elements such as heat, dampness ,frost, and precipitation on buildings-effect of chemical agents on

building materials- effect of pollution on buildings- damage due to biological agents like plants, trees, algae, fungus, moss, insects etc

### **MODULE II: Failure and repair of buildings**

Definition of building failure – functional, structural, and aesthetical failures- diagnostic testing methods and equipments-Effect of fire on buildings- repair of cracks in concrete and masonry-stitching, grouting, guniting etc.-repair and strengthening of concrete buildings – Foundation repair and strengthening- underpinning-leakage of roof and methods of repair.

### **MODULE III: Maintenance of buildings**

Routine maintenance of buildings-Annual maintenance of buildings-maintenance cost-Specifications for maintenance works – dampness - damp proofing courses-construction details for prevention of dampness-termite proofing-fire protection-corrosion protection.

### **MODULE IV: Building services**

**Plumbing:** Elements of plumbing-objectives of plumbing, purpose of plumbing, role of plumber, sewer, air supply pipes, drainage and vent pipes - application for obtaining supply connection.

Water carrying systems - types of pipes - G.I, PVC, CPVC, S.S Pipes, and joints in pipes.

Valves& fittings-types of valves.

Sanitary fixtures and building drainage system-different types of sanitary fittings,- principles of building drainage - syphonic action –traps and its types, capacity & sizing of pipe, soil pipe, waste pipe, rain water pipe, system of plumbing, installation of pipes, testing of pipes.

Introduction to other building services (*Topics under this section needs only brief description to understand their basic functions and requirements. Explanations with sketches are sufficient*) Lift – Location – RTT – Number of lifts – lift well and shaft – Machine room. Air conditioning system: Types of A/C – Capacity determination – Requirements for an A/C room. Electrical installations: Panel board & Buss bar, rising mains – distribution boards – MCM – ELCB – DP - TP and change over switch switches - Telephone and TV connectivity – Requirements of domestic gas pipeline.

### **REFERENCE**

1. S.P 25-1984 : (Hand book on causes and prevention of cracks in buildings)
2. Philip.H.Perkins : Concrete Structures-repair water proofing and protection
3. S. Champion : Failures and repair of concrete structures
4. Jacob Feld : Construction failures
5. Shetty M.S. : Concrete technology
6. P.K.Guha : Maintenance and repair of buildings