INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)**
SEMESTER	**7**
COURSE TITLE	**BUILDING SYSTEM, SAFETY AND SERVICES**
COURSE CODE	**01CI0719**
COURSE CREDITS	**3**

Objective:

1. To equip students with comprehensive knowledge and understanding of maintenance and repair issues in civil engineering, emphasizing plumbing and electrical systems
2. To familiarize students with the practical aspects of plumbing systems, including water storage, distribution, and maintenance, as well as electrical system installations and safety measures
3. To introduce students to safety protocols and regulations in the construction industry, emphasizing the importance of safety management in Indian construction practices
4. To provide students with hands-on experience and practical skills in implementing safety measures across different phases of construction projects, focusing on substructure, superstructure, and finishing phases

Course Outcomes: After completion of this course, student will be able to:

1. Identify and address maintenance and repair challenges in Plumbing and Electrical systems within a civil engineering career area.
2. Demonstrate practical skills in designing, installing, and maintenance of plumbing systems such as water storage, distribution, and drainage systems
3. Recognize safety regulations and emergencies in the building construction industry or any other construction field.
4. Apply safety measures from the ground level and up to the completion stage is a notable aspect that comes with completion of the substructure, superstructure, and finishing field of specialization.

Pre-requisite of course: Building Construction, Building Planning and Drawing

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	25	25

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Contents : Unit	Topics	Contact Hours
1	**Introduction** Definitions, Objectives and uses of services, Applications of services for different types of building considering, Classification of building services, Types of services, and selection of services, Role and Responsibility of Building Service Engineering, Building Management Services, Basic Concept of Smart Building	3
2	**Building System and Services** Plumbing: Importance, Water storage & distribution, heating method, Hot and Cold-water supply, dual pumping, pipe fittings, maintenance of plumbing systems, drainage system components, types & design, Different Pipe material, joints, fitting and valves., Electrical: Electrical system installations, technical terms and symbols for electrical installations and Accessories of wiring, electrical controls and safety devices like fuse, circuit breakers, lighting arresters etc., electrical wiring systems- material & specifications, electrical layout for residence, industrial and commercial buildings, school building., Lighting and Ventilation: Natural and artificial lighting principles and factors, Arrangement of luminaries, Distribution of illumination, Installation of lights, Lamp selection based on size of room, and Utilization factors. Necessity of Ventilation, Types, Natural and Mechanical, Factors to be considered in the design of Ventilation, Vertical Transportation: Different types of elevators and Escalators, Freight elevators, Passenger elevators, Hospital elevators, Uses of different types of elevators Escalators, Design Considerations, Location, Sizes, Component of Lifts, Necessity of Ramps, Design Consideration, Gradient Calculation for Ramp, Layouts and Special Features for Physically Abled and Elder people, Air Conditioning: Definition, Purpose, Principles, Temperature Control, Air Velocity Control, humidification, dehumidification, air circulation, Humidity Control, Air Distribution system, Cleaners, Filters, Spray washers, Electric preceptors, Types of Air Conditioners, Central type, Window Type, Split Unit	15
3	**Miscellaneous Services** Solar water Heating: Concept of Solar water heating, components, design principle, installation, maintenance, life cycle energy assessment., Acoustics: Building Acoustics, Requirement of good Acoustic, Objective, Acoustic Control in building, material like absorber and cavity resonators., Fire Protection: Causes of fire and Effects of fire, General Requirements of Fire Resisting building as per IS and NBC 2005, Characteristics of Fire Resisting materials, Fire Fighting Installations for Horizontal Exit, Roof Exit / Fire Lifts, and External Stairs., Rain Water Harvesting: Concept, Application, Methods, Case Studies	10

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Contents : Unit	Topics	Contact Hours
4	**Building Safety** Introduction to Indian Construction Industry, Importance & requirement of Construction Safety Management in Indian construction industry., Site requirement: site access, site boundary, site security, work's safe passage. Safety plan: emergency procedures, planning for the emergency, fire safety, first aid, on-site regulation., Substructure Phase: survey, site clearance, earthwork, Foundation work safety, welding and cutting work safety. Superstructure Phase: scaffolds, temporary structures, ladder safety and lift operation., Finishing Phase: roofing work, Painting and Plastering work, electrical safety, testing and commissioning. General requirement: hand power tool, traffic management, working over water, work permit.	14
Total Hours		**42**

Textbook :

1 Building construction, B. C. Punamia, Laxmi Publication, 2016

2 Building construction, P. C. Varghese, PHI Learning Ltd, 2014

References:

1 Building Services, Building Services, S. M. Patil, Seema Publication, Mumbai, 2008

2 The A to Z of Building Construction and its management, The A to Z of Building Construction and its management, Sandeep Mantri, Satya Prakashan, 2009

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
15.00	25.00	20.00	20.00	15.00	5.00

Instructional Method:

1 At the start of course, the course delivery pattern, prerequisite of the subject will be discussed

2 Lectures will be taken in class room with the use of multi-media presentations, white board– mix of both

3 Attendance is compulsory in lectures and laboratory which carries a 5% component of the overall evaluation

4 Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation

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Instructional Method:

5 Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval. It carries a weightage of 5%

6 Surprise tests/Quizzes will be conducted which carries 5% component of the overall evaluation

Supplementary Resources:

1 https://www.bis.gov.in/

2 https://bmsbuildingservice.com/

3 https://plumbingservices.com/

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