INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (CIVIL ENGINEERING)**
SEMESTER	**6**
COURSE TITLE	**BUILDING SERVICES AND MAINTENANCE**
COURSE CODE	**09CI0614**
COURSE CREDITS	**3**

Objective:

1 To understand and implement different types of building services required in various structures associated with the type and its purpose.

2 To understand and implement different types of building services required in various structures associated with the type and its purpose

3 To equip the student to deal with the installation and structural requirements in the building such as lifts, escalators, fire safety, lighting, and many other building services.

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

1 Outline building services provisions at construction projects.

2 Understand electrical components at construction site.

3 Describe various mechanical services in a building.

4 Plan a fire exit plan to prevent fire hazardous in a building.

Pre-requisite of course: Civil Engineering Materials, Building Planning & Drawing Construction Technology,

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction** Role and responsibility of Building Service Engineer, Introduction to BMS (Building Management Services), Various building categories as per NBC , Various types of building services, Objective of using various building services, Requirement of Ventilation Types –Natural and Mechanical, Factors affecting the Ventilation, Lighting principal and factor affecting, Concept of Smart building and green building, Solar Water Heating (RWH) system and Rainwater harvesting in a Building	9

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Contents : Unit	Topics	Contact Hours
2	**Electrical Services and its maintenance** Use of electric energy, Electricity generation, transmission, and distribution, Different terms related to electric circuit, Conventional symbols for electrical installation and accessories as per IS: 2032, Maintenance of the electric system in the building	5
3	**Mechanical Services in Buildings** Introduction of mechanical services, Lift, Types of Lifts, components of a lift, and arrangement of lift , Type and uses of dumbwaiters, Conveyor system and its types, Type and uses Elevators & Escalators, Uses of different types of elevators Escalators, Ramp: Necessity, layout, and Special features required for physically handicapped and elderly	7
4	**Fire Protection, Acoustic and Sound Insulations** Introduction to fire protection, Causes, and effects of fire, General Requirements of Fire Resisting building as per IS and NBC, Characteristics of Fire resisting materials, Fire detecting and various extinguishing systems, Fire exit plan and its components, Requirement of good Acoustic material, Sound insulations and Noise control in a building	7
Total Hours		**28**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**EXPERIMENT 1** A Report on NBC Code and its Understanding	4
2	**EXPERIMENT -2** The case study report on green building in India	2
3	**EXPERIMENT -3** Demonstrating the lightening principle using a lux meter/photometer	2
4	**EXPERIMENT -4** Sketches on Solar Water Heating (RWH) system and Rainwater harvesting in a Building	2
5	**EXPERIMENT -5** Sketches of Conventional symbols for electrical installation and accessories as per IS: 2032	2
6	**EXPERIMENT -6** Visit to nearest electrical shop and prepare a report on various illumination products and their installation requirements	2
7	**EXPERIMENT -7** Sketches of arrangement of lifts, different types of conveyors, details of escalators, and ramp layout	2
8	**EXPERIMENT -8** Plan a fire exit plan for a building as per NBC	6

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
9	**EXPERIMENT -9** Visit to nearest Hardware shop and prepare a report on various good Acoustic materials for noise control in the building	2
10	**EXPERIMENT -10** The topic of the Seminar shall be given to a group of students or on an individual basis. The students are required to submit and present/defend the Seminar in the presence of students and teachers and the report including a PowerPoint presentation to be attached with the submission. Each individual student's contribution to group work needs to be made explicit.	4
Total Hours		**28**

Textbook :

1 A textbook on Building Services, R. Uday Kumar, Eswar Press, Chennai, 2007

References:

1 Building Services, Building Services, S. M. Patil, Seema Publication, Mumbai Revised edition, 2019

2 National Building Code of India -2016, National Building Code of India -2016, Bureau of Indian Standards, BIS, New Delhi, .

3 Building Construction, Building Construction, Dr. B. C. Punmia, Laxmi Publications (P) Ltd., New Delhi, 2019

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**
40.00	40.00	20.00	0.00	0.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by the blackboard may also use any of the tools such as demonstration, role play, Quiz, brainstorming, MOOCs, etc

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory

3 A practical examination will be conducted at the end of the semester for evaluation of the performance of students in the laboratory.

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Instructional Method:

4 Students will use supplementary resources such as online videos, videos, e-courses, and Virtual Laboratories

Supplementary Resources:

1 https://archive.org/details/nationalbuilding01/in.gov.nbc.2016.vol1.digital/
2 https://archive.org/details/nationalbuilding02/in.gov.nbc.2016.vol2.digital/
3 https://www.grihaindia.org/
4 https://www.assocham.org/about-us.php
5 https://dgfscdhg.gov.in/fire-prevention
6 https://hareda.gov.in/centers/solar-water-heating-system/
7 https://www.worldlifeexpectancy.com/cause-of-death/fires/by-country/