

| Sl. No. | Sub. Code | Theory | Contact Hours | | | Credit |
|---------|-----------|--------------------------------|---------------|---|-----|--------|
| | | | L | T | P/S | |
| 5. | 22AE453 | Lighting & Electrical Services | 2 | 0 | 1 | 3 |

Course Objective This course gives basic understanding about the science behind Lighting, and fundamental principles of lighting design and electrical services in buildings. By learning this course students can design for optimum lighting requirements for indoor and outdoor spaces. Power distribution network and fundamentals of electrification in buildings is covered to impart technical and practical knowledge.

Anticipated Learning Outcomes: Ability to work out electrical networks for a simple building, determine general lighting and acoustic requirements and performance for a space.

**Module 1
Introduction to daylighting** Physics of light, Transmission of light, coloured light, the Munsell system, Photometry (Law of illumination, illumination from point, line and surface sources), recommended illuminances, Glare, Luminance distribution.

**Module 2
Design for daylighting** Day lighting Design Principles, Design methods, Total flux method, Daylight factor method, Planning for daylight, day light utilization factor, Simple experiments to measure Lux levels under different sky conditions, Class room lux measurements, etc.

**Module 3
Artificial lighting** Classification of lighting, Artificial light sources, Spectral energy distribution, Luminous efficiency, Colour temperature, Colour rendering.

Types of luminaires, Power factor, reflector, type of lens, cove lighting, cornice lighting, track lighting, wall washer, down light, spotlight and stage lighting.

Exterior lighting –Flood, street, lighting for displays and signalling, Neon signs LED-LCD and lighting for surveillance.

General Illumination design and interior lighting: industrial, residential, office departmental store, indoor stadium, theatre, museum, hospital.

Module 4
Electrical services General distribution of electric power in towns and cities. Substation for small schemes and industrial units, supply undertaking, meter room, electrical installation in buildings, connection with the supply company, mains and meter board installation from the meter board to individual units.

Basics of electricity, Single and Three Phase Supply, Protective devices in electrical installation, Earthing for safety – Types of earthing, ISI Specifications.

Electrical installations in buildings – Types of wires, Wiring systems and their choice – planning electrical wiring for building – Main and distribution boards, Planning transformer and generator rooms, Standby Generators and Inverter Backup Systems; Electrical Load Calculation of Buildings. Electrical layout of a simple residential, school and commercial building

Module 5 Any topic on modern, energy saving and sustainable lighting and electrification techniques as decided by the teacher.

Note: Most Architectural subjects do not have Textbooks. The Reference books mentioned below are for reference only and University question paper should be prepared from the Syllabus descriptions.

References

1. Szokolay, S. V. (2008). *Introduction to architectural science*. Taylor and Francis.
2. Conceptnine, R. (2008). *The Architecture of Light: Architectural Lighting Design Concepts and Techniques*. Sage Publications.
3. Cox, T. J. and D'Antonio, P. (2009). *Acoustic Absorbers and Diffusers*. 2nd Ed. Taylor and Francis
4. Cuttle, C. *Lighting by Design*. 2nd Ed. Architectural Press.
4. Reinhart, C. (2014). *Day lighting Handbook*. Steffy, G. (2000). *Time-Saver Standards for Architectural Lighting*. McGraw-Hill.
5. Philips, D., *Lighting in Architectural Design*, McGraw Hills, New York.
6. Bovay, H. E. (1981). *Handbook of Mechanical and Electrical systems for Buildings*. McGraw-Hill Higher Education.
7. Bureau of Indian Standards. (2005). *Code of Practice for Electrical Wiring Installations IS-732*.
8. *Electrical Wiring and Contracting (Vol.1 to Vol.4)*.
9. *National Building Code, 2016, Bureau of Indian Standards*
10. Salvan, George S., *Architectural Utilities 3: Lighting & Acoustics*