AE524	Lighting and Electrical Services	HRS 3-0-1	CR-4

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 requirement for indoor and outdoor spaces. Power distribution network and fundamentals of electrification in buildings is covered to impart technical and practical knowledge.

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

Daylighting 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 skyconditions, 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 luminaries, Power factor, reflector, type of lens, cove lighting, cornice lighting, track lighting, wall washer, down light, spot light and stage lighting.
Exterior lighting –Flood, street, lighting for displays and signaling, Neon signs LED-LCD and lighting for surveillance.
General Illumination design & 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 & generator rooms, Standby Generators & 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.

References

1. Szokolay, S. V. (2008). Introduction to architectural science. Taylor & 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 & Francis
4. Cuttle, C. Lighting by Design. 2nd Ed. Architectural Press.
5. Rea, M. (2000). The Lighting Handbook. 9th Ed. Illuminating Engineering Society of NorthAmerica.
6. Reinhart, C. (2014). Day lighting Handbook. Steffy, G. (2000). Time-Saver Standards forArchitectural Lighting. McGraw-Hill.
7. Philips, D., Lighting in Architectural Design, MCGraw Hills, New York.
8. Bovay, H. E. (1981). Handbook of Mechanical & Electrical systems for Buildings. McGraw-Hill Higher Education.
9. Bureau of Indian Standards. (2005). Code of Practice for Electrical Wiring Installations IS-732.
10. Electrical Wiring & Contracting (Vol.1 to Vol.4).