

AMID-21 ENVIRONMENTAL CONTROL – I

Course overview:

This course is intended to study Acoustics and lighting as determinants of built form with an emphasis on the application to the Interior spaces.

Objectives of the course:

To equip the students with tools for application of acoustical and lighting design in the interiors.

Expected skills/ knowledge Transferred:

- The knowledge of specific acoustic and lighting requirements of different spaces.
- Skills to deal with acoustic and lighting problems within buildings.
- Knowledge that enables to deal effectively with specialists and consultants in acoustics and lighting.

Course Contents:

Unit – I

Need to study acoustics, methods used for good acoustics. Basic theory: Generation, propagation, transmission, reception of sound: Frequency, wave length and velocity of sound, sound intensity, inverse square law, Decibel scale.

Unit –II

Human ear, Loudness perception, subjective effects, characteristics of sound in speech and music. Speech privacy and annoyance, background noise. Communication in open plans, electronic sound systems, loud speaker's layout.

Unit – III

Room acoustics: Behavior of sound in enclosed spaces. Ray-diagrams, sound paths, effect of geometry and shapes, sound absorption, sound absorption coefficients, Sabine's formula, reverberation and resonant panels.

Unit – IV

Acoustic Design process and different types of buildings – auditoriums, concert halls, cinema halls, seminar rooms, lecture halls, classroom and open offices.

Unit – V

Noise reduction, sound isolation, transmission loss. TL for walls, sound leaks in doors, noise reduction between rooms, construction details for noise reduction. Noise reduction and built form. Noise reduction from mechanical equipment. Rubber mounts, vibration isolation guidelines, characteristics of duct system, noise in AC ducts, vibration isolation of pumps and generators.

Unit- VI

Introduction – Lighting and vision, basic units, photometry and measurement. Effects of good lighting, considerations for good lighting, brightness, glare, contrast and diffusion. Economic issues of lighting.

Unit VII

Quality and quantity of different sources of light – daylight, incandescent, fluorescent, halogen, electric gas discharge high discharge, neon, cold cathode, mercury, sodium vapor etc. lighting levels, visual field. Survey of lamps available in the market with cost and technical specifications.

Unit VIII

Day light – advantages, admitting daylight, controlling daylight – multiple glazing, orientation, window treatments, potentials of day lighting as an energy resource.

Artificial lighting - color characteristics of artificial lighting, integration of day lighting with artificial lighting, lighting controls, intelligent building systems for lighting, switches, dimmers.

Unit IX

Planning lighting – general aims, lighting needs, calculation of lighting levels, intensity levels, energy and installation costs and other factors, selection of fixtures, location and placing of fixtures.

Unit X Lamps and lighting fixtures – Floor, table and desk, wall mounted, ceiling units, built in lighting, miscellaneous types, decorative lighting, spot lighting, task lighting, underwater lighting etc.

Note: Detailed acoustic design and lighting should be done for any one type of building.

Reference Books:

- Poella . L. Leslie, Environmental Acoustics.
- Moore J.E. , Design of good acoustics, The architectural press, London, 1961.
- Burris, Harold, Acoustics for Architect.
- Lord, Peter and Tempelton, Duncan, The Architecture of sound,. ; Designing places of Assembly , Architectural press ltd, London, 1986.
- Egan David, Architectural acoustics, Mc-Graw Hill Book company, New york, 1988.
- John.F. Pile, Interior Design, 2nd edition, illustrated, H.N.Abrams, 1995.
- Wanda jankowski, Lighting : In Architecture and Interior Design, pbc intl, 1995.
- Moore Fuller, Concepts and practice of Architectural Day lighting, Van Nostrand Reinhold co., New York, 1985.
- David Egan. M. Concepts in Architectural lighting Mcgraw Hill Book company, New York, 1983.

