RCETCEAC07 - Functional Design of Buildings

Course outcomes:

- Develop an understanding of acoustical design and noise control techniques
- Understand elemental concepts of natural and artificial lighting designs
- Know the principals involved in the design of buildings for thermal comfort and influence of climate on design of buildings

Syllabus:

UNIT I

Acoustical / Sonic Environment and acoustical comfort

Sound, Nature of sound- Behavior ofsound in enclosed spaces-Concept of Geometric Acoustics-Reflection of sound and their applications- Absorption of sound-Sound absorption coefficient-Human Audibility range- Reverberation & Reverberation Time Calculation- Flanking paths- Sound absorption-materials and fixings- Reverberation-Sabine's formula-Keyrings modification.-Basic design of the elements for the required degree of sound insulation- Air and structure born noises-equivalent noise levels-day and night equivalent.Acoustics, applications:Measures of noise control- Source-path and receiving end. TL valueand computation of TL value, Acoustical defects

UNIT II

Natural lighting: Visual task requirements, Units of Light, Light, Vision and Buildings, Standards of Lighting and Visual comfort-The sky as a source of light, Daylight factor, Daylightpenetration-Calculation of daylight factor. Design of side-lit windows-BIS and CBRI methods skylights

Artificial lighting: Artificial lighting- illumination requirements-lux meter – lamps and luminaries – polar distribution curves– Color temperature and color rendering index- glare - Design of artificial lighting – lumen method – point by point method. Basic idea of street lighting and outside lighting

UNIT III

Thermal comfort: Factors affecting thermal comfort- effective temperature- thermal comfort indices-ET-CET Charts- Bioclimatic chart- Psychometric and Psychometric chart. Earth-Sun relationship: Sun's

apparent movement with respect to the earth. Solar angles- Computation of solar radiation on different surfaces-solar path diagram-shadow-throw conceptand design of shading devices.

Reference Text Books:

1. Ajitha Simha.D, Building Environment, Tata McGraw Hill Publishing Co., New Delhi, 1985
2. Bureau of Indian standards, Handbook on Functional Requirement of Buildings
3. Givoni. B Man,. Climate and Architecture, Applied Science Publication, 19764.
4. Knudsen V.O. and Harris C.M., Acoustical Design in Architecture, John Wiley, 1980
5. Koenigseberger, Manual of tropical Housing and Building Part I – Climatic design, Orient Longman,2011
6. Krishnan, Climate responsive architecture, Tata McGraw Hill, 1999
7. .M David Egan , Architectural Acoustics, J.Ross Publishing, 2007.