

Module 1

SUSTAINABLE PRINCIPLES AND PRACTICES

Introduction to the ideas, issues and concepts of sustainable development; principles of environmentally and ecologically sensitive architecture; Importance of water, energy, materials and community in architecture for sustainable development; Brief introduction to green rating systems and criteria for evaluation of different categories of built development - IGBC, GRIHA and LEED rating systems.

Module 2

GREEN BUILDING DESIGN

Sustainable site planning and landscape design; Building form and orientation for sun and Wind; Building envelope design- Fenestration design, shading devices, facade treatment, efficient use of daylighting; Integrated Use of Landscape: Vertical Landscape, Green Wall, Green Roof

Module 3

SOLAR PASSIVE TECHNIQUES

Passive Heating techniques : General principles – Direct gain systems - Glazed walls, Bay windows, Attached sun spaces etc. Indirect gain systems – Trombe wall and Solar Chimney
Passive Cooling techniques : General principles – Evaporative cooling, Nocturnal radiation cooling, Passive Desiccant cooling, induced ventilation, earth sheltering, Wind Towers, Earth-Air tunnels, Air Vents.

Case studies on buildings designed with passive heating and cooling techniques.

Module 4

GREEN PRACTICES AND TECHNOLOGIES

Energy utilization in buildings, Renewable and Non-Renewable energy sources. Integration of non-conventional energy systems from renewable source of energy-solar (photo voltaic), wind and biomass

Water conservation practices- Rainwater Harvesting systems; Recycling of waste water: Physical, Chemical and Biological treatment methods, Rootzone treatment, Use of recycled water.

Environment friendly materials (paints, light sensitive glass, etc), Embodied energy of materials, Bio-degradable materials, Recycling and Reuse of materials.

Module 5

Introduction to building performance simulation software (as decided by the faculty)

Example- Ecotect, IES (Integrated Environmental solutions), Radiance.

Reference

1. Sustainable design manual, Vols. 1 & 2, The energy and resource institute, New Delhi.
2. Krishan, A. and Nick Baker, Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings, McGraw Hill Education Private Limited, India, 2001.
3. Energy Conservation Building Code (ECBC), USAID-INDIA.
4. Szokolay, S.V., Introduction to Architectural Science - The Basis of Sustainable Design, Architectural

Press.

5. Ralph Lebens M., *Passive Solar Architecture in Europe – 2*, Architecture Press, London 1983.
6. Mandler S. & Odell W., *The Guide Book Of Sustainable Design*, John Wiley & Sons, 2000.
7. Lawson B., *Bulding Materials, Energy And The Environment; Towards Ecologically Sustainable Development Raia, Act, 1996*.