

6.3.3 GREEN BUILDINGS

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RATIONALE

Buildings have major impact on the environment and human health during its construction and also lifelong its use. It accounts large amount of land use, water and energy consumption causes air and atmospheric pollution. Green Buildings bring environment friendly construction and utilization; ultimately reduce green house gas emissions and impact on climate change. Hence, Green Building subject is introduced in the curriculum of Diploma in Civil Engineering Course at Polytechnic Level.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

- CO1 Describe various aspects of green buildings along with their design concepts.
- CO2 Identify different green building construction materials.
- CO3 Integrate renewable energy systems in the green building construction
- CO4 Discuss the construction of green building with prevailing energy conservation policy and regulations
- CO5 Identify various water efficient fixtures and use rainwater harvesting techniques
- CO6 Evaluate different type of Green Building Ratings for certification of building

DETAILED CONTENTS

UNIT – I

Green Building Planning: Objectives, Benefits, Principles and Features of green buildings, Site selection and planning of Green building,

Green Building Design Concepts: Passive solar design concepts, Orientation, Building Envelope, Roof, Walls, Fenestration, Shading and Colour

UNIT – II

Eco-friendly Green Building Materials: Bamboo, Rice husk ash concrete, Plastic bricks, Bagasse particle board, Insulated concrete forms, Fly ash bricks, Autoclave aerated blocks, Hollow concrete blocks, Sun controlled glass, UPVC windows, Sun reflective paints

Reuse of waste material: Plastic, Rubber, Newspaper, Wood, Nontoxic paint, Green roofing.

UNIT – III

Renewable Energy Systems: Solar Thermal Systems, Solar Water Heating System, Solar chimney, Wind mills. Solar Photovoltaic Systems; Rooftop Solar Power Plant, Solar Lights, Net-metering system
Energy Efficiency: Use of Energy Conservation Building Code (ECBC), Energy Efficient Star Labelled Appliances, Energy monitoring and evaluation, Energy Auditing and implementation of energy conservation measures

UNIT – IV

Water Efficiency: Use of water efficient fixtures for kitchen, washrooms (water closets & urinals) and landscape gardens, Rainwater harvesting, Waste water management.

Indoor Environment Quality: Natural air ventilation, Day lighting, various types of low Volatile Organic Compounds materials

UNIT – V

Green Building Rating and Certification: Features, criterion and compliance of the Leadership in Energy and Environment Design, (LEED India), Green Rating for Integrated Habitat Assessment (GRIHA), Bureau of Energy Efficiency (BEE).

Field Visits: Field visits for study of green building construction in the region

RECOMMENDED BOOKS

1. “Energy Conservation Building Code (ECBC)”, Publication of Bureau of Energy Efficiency, Ministry of Power, Government of India.
2. “Rating Manuals of Indian Green Building Council”, Hyderabad.
3. “Rating Manuals of GRIHA”, TERI, New Delhi

RECOMMENDED WEBSITES

1. <https://swayam.gov.in/>
2. <https://www.udemy.com/>
3. <https://www.upgrad.com/>
4. <https://www.khanacademy.org/>

INSTRUCTIONAL STRATEGY

Green Building subject involves introduction through lectures-cum-discussions, field work and site visits. The students should be taught this subject through case studies. This subject contains five units of equal weightage.