

**GREEN BUILDINGS**

Course Code	<b>21CV485</b>	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0+2+0+0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	1	Exam Hours	01

**Course objectives:** This course will enable students to:

1. Understand the Definition, Concept & Objectives of the terms cost effective construction and green building
2. Apply cost effective techniques in construction
3. Apply cost effective Technologies and Methods in Construction
4. Understand the Problems due to Global Warming
5. State the Concept of Green Building
6. Understand Green Buildings

**Teaching-Learning Process (General Instructions)**

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Blackboard teaching/PowerPoint presentations (if needed)
2. Regular review of students by asking questions based on topics covered in the class.

**Module-1**

**Introduction to the concept of cost effective construction** -Uses of different types of materials and their availability -Stone and Laterite blocks- Burned Bricks- Concrete Blocks- Stabilized Mud Blocks- Lime Pozzolana Cement- Gypsum Board- Light Weight Beams- Fiber Reinforced Cement Components- Fiber Reinforced Polymer Composite- Bamboo- Availability of different materials-Recycling of building materials – Brick- Concrete- Steel- Plastics - Environmental issues related to quarrying of building materials.

<b>Teaching-Learning Process</b>	1.Blackboard teaching/PowerPoint presentations (if needed) 2.Regular review of students by asking questions based on topics covered in the class.
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**Module-2**

**Environment friendly and cost effective Building Technologies** - Different substitute for wall construction Flemish Bond - Rat Trap Bond – Arches – Panels - Cavity Wall - Ferro Cement and Ferro Concrete constructions – different pre cast members using these materials - Wall and Roof Panels – Beams – columns - Door and Window frames - Water tanks - Septic Tanks - Alternate roofing systems - Filler Slab - Composite Beam and Panel Roof -Pre-engineered and ready to use building elements - wood products - steel and plastic - Contributions of agencies - Costford - Nirmithi Kendra - Habitat

<b>Teaching-Learning Process</b>	1.Blackboard teaching/PowerPoint presentations (if needed) 2.Regular review of students by asking questions based on topics covered in the class.
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**Module-3**

**Global Warming** – Definition - Causes and Effects - Contribution of Buildings towards Global Warming - Carbon Footprint – Global Efforts to reduce carbon Emissions Green Buildings – Definition - Features- Necessity – Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings – Embodied Energy in Materials Green Materials - Comparison of Initial cost of Green V/s Conventional Building - Life cycle cost of Buildings.

<b>Teaching-Learning Process</b>	1.Blackboard teaching/PowerPoint presentations (if needed) 2.Regular review of students by asking questions based on topics covered in the class.
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**Module-4**



**Green Building rating Systems- BREEAM – LEED - GREEN STAR -GRIHA ( Green Rating for Integrated Habitat Assessment) for new buildings – Purpose - Key highlights - Point System with Differential weight age. Green Design – Definition - Principles of sustainable development in Building Design - Characteristics of Sustainable Buildings – Sustainably managed Materials - Integrated Lifecycle design of Materials and Structures (Concepts only)**

**Teaching-Learning Process**

- 1.Blackboard teaching/PowerPoint presentations (if needed)
- 2.Regular review of students by asking questions based on topics covered in the class.

#### **Module-5**

#### **Utility of Solar Energy in Buildings**

Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings.

#### **Green Composites for Buildings**

Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment.

**Teaching-Learning Process**

- 1.Blackboard teaching/PowerPoint presentations (if needed)
- 2.Regular review of students by asking questions based on topics covered in the class.

#### **Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% ( 18 Marks out of 50)in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

#### **Continuous Internal Evaluation:**

Three Unit Tests each of **20 Marks (duration 01 hour)**

1. First test at the end of 5<sup>th</sup> week of the semester
2. Second test at the end of the 10<sup>th</sup> week of the semester
3. Third test at the end of the 15<sup>th</sup> week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4<sup>th</sup> week of the semester
5. Second assignment at the end of 9<sup>th</sup> week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks (duration 01 hours)**

6. At the end of the 13<sup>th</sup> week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

**CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.**

#### **Semester End Examination:**

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject **(duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module

**Suggested Learning Resources:**

**Text Books**

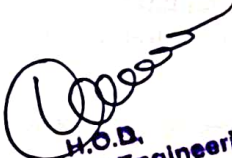
1. Harhara Iyer G, Green Building Fundamentals, Notion Press
2. Dr. Adv. Harshul Savla, Green Building: Principles & Practices

**Web links and Video Lectures (e-Resources):**

- <https://www.youtube.com/watch?v=THgQF8zHBW8>
- [https://www.youtube.com/watch?v=DRO\\_rkywxQ](https://www.youtube.com/watch?v=DRO_rkywxQ)

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- Students have to visit a building which is green rated and prepare a report

  
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