



K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109
DEPARTMENT OF CIVIL ENGINEERING
SESSION: 2022-2023 (EVEN SEMESTER)

CO-PO Mapping

Course: Green Buildings		Course Code: BETCK205B	
Type: Theory			
No of Hours			
Theory (Lecture Class)+Tutorial	Practical/Field Work/Allied Activities	Total/Week	Total teaching hours
3L	-	3	40
Marks			
Internal Assessment	Examination	Total	Credits
50	50	100	3
Aim/Objectives of the Course			
<ul style="list-style-type: none"> To make students understand the definition, concept & objectives of the terms cost effective construction and green buildings. To make students learn the various methods of applying environment friendly and cost effective techniques in construction. To make students learn the causes, effects and problems due to global warming. To make students learn the concepts, importance and rating systems of green buildings. 			
Course Learning Outcomes			
After completing the course, the students will be able to			
CO1	Explain the different cost-effective building materials for construction.	Understanding (K2)	
CO2	Explain the various environment friendly and cost effective building technologies in construction.	Understanding (K2)	
CO3	Explain the causes, effects and measures to reduce global warming due to different materials in construction.	Understanding (K2)	
CO4	Explain the different green building rating systems.	Understanding (K2)	
CO5	Discuss the various alternative sources of energy and effective management of water, solid waste and sewage.	Understanding (K2)	
Syllabus Content			
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.			CO1 8 hrs PO1-3 PO6-3 PO7-3 PO12 -3 PSO1-3

<p>LO: At the end of this session the student will be able to,</p> <ol style="list-style-type: none"> 1. Explain the concept of cost-effective construction. 2. Explain the different types of building materials, their properties and applications. 3. Explain the various Environmental issues related to quarrying of building materials. 	<p>PSO2-2</p>
<p>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 - Cost ford -Nirmithi Kendra – Habitat.</p> <p>LO: At the end of this session the student will be able to,</p> <ol style="list-style-type: none"> 1. Explain the various alternative techniques used for construction of walls. 2. Explain about ferrocement and ferroconcrete constructions. 3. Explain the various alternate roofing systems. 	<p>CO2</p> <p>8 hrs</p> <p>PO1-3 PO6-3 PO7-3 PO12 -3 PSO1-3 PSO2-2</p>
<p>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.</p> <p>LO: At the end of this session the student will be able to,</p> <ol style="list-style-type: none"> 1. Define global warming. 2. Explain the necessity, causes and effects of global warming due to building materials in construction. 3. Discuss the measures undertaken to reduce global warming and carbon footprint. 4. Explain embodied energy in materials used for construction. 5. Explain the concept of life cycle cost of buildings. 	<p>CO3</p> <p>8 hrs</p> <p>PO1-3 PO6-3 PO7-3 PO12 -3 PSO1-3 PSO2-2</p>
<p>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).</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the various rating systems for green buildings. 2. Explain the concept of green design and principles of sustainable development in building design. 3. Explain the concept of integrated lifecycle design of materials and structures. 	<p>CO4</p> <p>8 hrs</p> <p>PO1-3 PO6-3 PO7-3 PO12 -3 PSO1-3 PSO2-2</p>

<p>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 Utilization 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.</p> <p>LO: At the end of this session the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the alternate sources of energy in building construction. 2. Explain the concept of solar passive cooling and heating of buildings. 3. Explain the concept of green composites. 4. Discuss the various methods to be adopted for effective utilization of water and management of solid waste and sewage. 	<p>CO5</p> <p>8 hrs</p> <p>PO1-3 PO6-3 PO7-3 PO12 -3 PSO1-3 PSO2-2</p>
<p>Text Books</p> <ol style="list-style-type: none"> 1. Harihara Iyer G, Green Building Fundamentals, Notion Press. 2. Dr. Adv. Harshul Savla, Green Building: Principles & Practices. 	
<p>Reference Books</p> <ol style="list-style-type: none"> 1. Charles J. Kibert, Sustainable Construction: Green Building Design and Delivery, 5th Edition, March 2022. 2. Abe Kruger, Green Building: Principles and Practices in Residential Construction, Delmar Cengage Learning; New edition (3 January 2012) 3. LEED Certification Guidebook. 4. IGBC Green New Buildings Rating System (Version 3.0). 	
<p>Useful Websites</p> <ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=THgQF8zHBW8 2. https://www.youtube.com/watch?v=DRO_rlkywxQ 	
<p>Useful Journals</p> <ol style="list-style-type: none"> 1. Journal of Green Building (https://www.scienceopen.com/collection/JournalofGreenBuilding) 2. Sustainable Buildings (https://www.sustainable-buildings-journal.org/) 	
<p>Teaching and Learning Methods</p> <p>Lecture class: 40 hrs Tutorial class: 11hrs Revision class: 05 hrs</p>	
<p>Assessment</p> <p>Type of test/examination: Written examination.</p> <p>Continuous Internal Evaluation (CIE): 50 marks. Average of two internal assessment tests each of 25 marks. Any two assessment methods (continuous comprehensive assessments: assignments, problem-solving activity, quiz, presentations, group discussions) for 25 marks.</p> <p>Semester End Exam (SEE): 100 marks (students have to answer all main questions) which will be scaled down to 50 marks.</p> <p>Test duration: 1 hr Examination duration: 3 hrs</p>	

CO to PO Mapping

PO1: Science and Engineering Knowledge	PO7: Environment and Society
PO2: Problem Analysis	PO8: Ethics
PO3: Design & Development	PO9: Individual & Team Work
PO4: Investigations of Complex Problems	PO10: Communication
PO5: Modern Tool Usage	PO11: Project Mngmt & Finance
PO6: Engineer & Society	PO12: Life long Learning

PSO1: The proficiency in mathematics, physical and management sciences helps to excel in the areas of planning, analysis related to Civil Engineering systems.

PSO2: Identify sustainable materials and technologies, codes of practice in construction industry and transportation Systems.

CO	PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
BETCK 205B	K-level														
CO1	K2	3	-	-	-	-	3	3	-	-	-	-	3	3	2
CO2	K2	3	-	-	-	-	3	3	-	-	-	-	3	3	2
CO3	K2	3	-	-	-	-	3	3	-	-	-	-	3	3	2
CO4	K2	3	-	-	-	-	3	3	-	-	-	-	3	3	2
CO5	K2	3	-	-	-	-	3	3	-	-	-	-	3	3	2

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