

B.Tech. IV Semester VII

Subject Name : Green Building and Energy Conservation **Subject Code:** BTCL15702
Type of course : OE-III
Prerequisite : Environmental Sciences BTMD17102
Rationale : The course helps to understand the concept of green buildings, planning and rating of green building. The course also gives brief understanding of energy conservation.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	100
3	0	0	3	60	25	15	-	-	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests) **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Fundamentals of Green Buildings and Human Comfort: Definition of green buildings and sustainable development, typical features of green buildings, benefits of green buildings towards sustainable development. Reduction in Energy Demand, Review of topics on thermal comfort Classification of climate zones, Onsite Sources and Sinks, Maximize System Efficiency, Use Onsite Sources and Sinks	10	25%
2	Green Buildings: Site selection and planning: Criteria for site selection, preservation of landscape, soil erosion control, minimizing urban heat island effect, Passive Planning : maximize comfort by proper orientation of building facades, day lighting, ventilation, etc. Water conservation and efficiency: Rainwater harvesting methods for roof & non-roof, reducing landscape water demand by proper irrigation systems, water efficient plumbing systems, water metering, waste water treatment, recycle and reuse systems , Innovative Materials : Green building materials and products – Bamboo, rice husk ash concrete, plastic bricks, bagasse particle board, insulated concrete forms. Reuse of water material – plastic, rubber, newspaper wood, non-toxic paint, green roofing.	16	35%



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3	Green building rating and Audit systems Global/ National Green Institute, overview of the criteria as per these rating systems, Audit	03	5%
4	Energy conservation: Basic understanding of energy conservation and its importance, Steps to Reduce Energy Demand, Review of traditional architecture and energy conservation, Renewable Energy Resources : Solar Energy, wind Energy, Ocean Energy, Hydro Energy, Biomass Energy, Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels, Energy conservation: Introduction, Specific objectives, present scenario, Need of energy conservation, Energy Efficiency, Functions of Government organization working for Energy conservation and Audit, Salient features of Energy Conservation Act-2001, ECBC guidelines	16	35 %

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	25	15	15	15	5

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels (**Revised Bloom's Taxonomy**)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of Publication	Publication Edition
1.	Green Buildings Fundamentals	Mike Montaya	Pearson 9780133002980	2010	2 nd
2.	Green Building: Principles and Practices	Dr. Adv. Harshul Savla	Notion Press 978-1685866044	2021	1 st
3.	Green Building: Principles and Practices in Residential Construction (Go Green with Renewable Energy Resources)	Abe Kruger , Carl Seville	Delmar Cengage Learning 978-1111135959	2012	-
4.	Energy conservation and green building	Vaibhao K. Sonarkar , Dr. Dinesh Kumar Gupta	Nirali Prakashan 978-9389108316	2019	-
5.	Green Building, A to Z	Jerry Yudelson	New Society Publishers 978-0865715721	2007	-

OE-III : Open Elective -III

W.e.f. AY 2021-22



6.	Green Building and Energy Efficiency	Matilda Schmidt	Syraewood Publishing House 9781682863237, 9781682863237	2019	-
7.	Energy Management and Conservation	K. V. Sharma , P. Venkateshaiah	I K International Publishing House Pvt. Ltd 978-9381141298	2013	-

Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Identify the components and principles of the green building (R, U, A, N, E -- Cognitive Level)	25
CO-2	Study different strategies for Design of the green building construction (R,U, A, N, C --Cognitive Level)	35
CO-3	Study the relevant rating system for assessment of Green building (R, U, A, -- Cognitive Level)	5
CO-4	Study the present practices adopted in energy conservation (R, U, A, N, E -- Cognitive Level)	35

Mapping with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	2	2	1	3	3	2	2	1	3	1	1	3	1	3	2
CO-2	2	2	2	3	1	1	1	1	1	1	1	1	2	2	1
CO-3	1	1	1	1	1	3	2	3	2	2	1	2	3	1	1
CO-4	2	2	3	3	3	1	1	1	1	1	1	1	1	3	1
Rationale*	7	7	7	10	8	7	6	6	7	5	4	7	7	9	7

Rationale*: The content of subject is inclined to have a brief study of green building , features, rating of green buildings and importance of energy conservation.

List of Open Source/learning website:

1. <https://nptel.ac.in/courses/105102195>
2. <https://nptel.ac.in/courses/105102195>
3. <https://nptel.ac.in/courses/105102195>
4. https://www.grihaindia.org/static/Griha%20Rating%20Booklet_Dec12.pdf
5. [https://igbc.in/igbc/html_pdfs/abridged/IGBC%20Green%20New%20Buildings%20Rating%20System%20\(Versio%203.0\).pdf](https://igbc.in/igbc/html_pdfs/abridged/IGBC%20Green%20New%20Buildings%20Rating%20System%20(Versio%203.0).pdf)