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Green Building and Energy Conservation — Complete Syllabus (Program Elective-1, Option A)

BTEUP Diploma in Civil Engineering • 5th Semester • Session 2026-27
Subject 5.5 (Program Elective-1, Option A) • Total 100 Marks • 2 Credits • L 2 • Choose
this OR Repair and Maintenance of Building

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.5	Program Elective-1: Green Building and Energy Conservation	Theory	2 - 0	2	Theory 40	Theory 60 (3 hrs)	100
Green Building and Energy Conservation Total				2	40	60	100

What This Subject Aims To Do

To know various aspects of green buildings, use the steps involved in measuring environmental impact assessment, relate the construction of green buildings with prevailing energy conservation policy and regulations, identify different green building construction materials, and learn different rating systems and their criteria.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks	Share
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1	Introduction to Green Building and Design Features	5	10%
2	Energy Audit and Environmental Impact Assessment (EIA)	6	25%
3	Energy and Energy Conservation	6	25%
4	Green Building	6	25%
5	Rating System	5	15%

Unit 1 — Introduction to Green Building and Design Features (5 Periods, 10%)

Topics: Definition of green building, benefits of green building, components/features of green building, site selection, energy efficiency, water efficiency, material efficiency, indoor air quality; site selection strategies, landscaping, building form, orientation, building envelope and fenestration, material and construction techniques, roofs, walls, fenestration and shaded finishes, advanced passive heating and cooling techniques, waste reduction during construction.

Unit 2 — Energy Audit and Environmental Impact Assessment (EIA) (6 Periods, 25%)

Topics: Energy audit: meaning, necessity, procedures, types, energy management programs. Environmental Impact Assessment (EIA): introduction, EIA regulations, steps in environmental impact assessment process, benefits of EIA, limitations of EIA, environmental clearance for the civil engineering projects.

Unit 3 — Energy and Energy Conservation (6 Periods, 25%)

Topics: Renewable energy resources: solar energy, wind energy, ocean energy, hydro energy, bio-mass energy, geo thermal 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, LEED India Rating System and energy efficiency.

Unit 4 — Green Building (6 Periods, 25%)

Topics: Introduction: definition of green building, benefits of green building. Principles: principles and planning of green building. Features: salient features of green building, environmental design (ED) strategies for building construction. Heating Ventilation Air Conditioning (HVAC) unit in green building. Process: improvement in environmental quality in civil structure. Materials: green building materials and products — bamboo, rice husk ash concrete, plastic bricks, bagasse particle board, insulated concrete forms; reuse of waste material — plastic, rubber, newspaper wood, nontoxic paint, green roofing.

Unit 5 — Rating System (5 Periods, 15%)

Topics: Introduction to (LEED) criteria; Indian Green Building Council (IGBC) green rating; Green Rating for Integrated Habitat Assessment (GRIHA) criteria; functions of government organisation working for Energy Conservation and Audit (ECA): National Productivity Council (NPC), Ministry of New and Renewable Energy (MNRE), Bureau of Energy Efficiency (BEE).

Reference Books (as listed in the syllabus)

- Kibert, C.J., Sustainable construction: Green Building design and Delivery, John Wiley, Hoboken, New Jersey.
- Chauhan, D S, Sreevasthava, S K., Non-conventional Energy Resources, New Age International Publishers, New Delhi.
- O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi.
- Jagadeesh, K S, Reddy Venkatta Rama & Nanjunda Rao, K S., Alternative Building Materials and Technologies, New Age International Publishers, Delhi.
- Sam Kubba., Handbook of Green Building Design and Construction, Butterworth-Heinemann.
- Means R S, Green Building - Project Planning and Cost Estimating, John Wiley & Sons.
- Sharma K V, Venkateshaiah P., Energy Management and Conservation, IK International.

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.