

Subject Code: 1ET4010506	Subject Title: Green Building and Energy Conservation
Pre-Requisite	

RATIONALE:

Today's homebuyers are increasingly interested in green building as it improve the way homes use energy, water, and materials, to reduce negative impacts on human health and the overall environment-both during construction and over its lifetime. Building heating and cooling are the most energy-intensive activities, followed by electricity use for lighting and appliances. Rising standards of living result in more energy services required for heating, cooling, lighting and communicating. The environmental management and audit is necessary to study the impact of various industries on natural resources. Green building use the resources optimally, reduce waste and reduce the cost of life cycle and provide healthy indoor environment for its occupants through restoring/improving the natural environment. Therefore this course will enable the students to face these challenges of today's era in most effective way to build the structures as green one to improve the quality of environment significantly.

COURSE OBJECTIVE:

The content should be taught and implemented with the aim to develop skills so that students are able to acquire following competencies:

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

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
03	-	02	04	60	40	20	30

DETAILS OF COURSE CONTENTS:

S.NO.	TOPIC	Total Hrs.	WEIGHTAGE
1	Introduction to Green Building and Design Features: 1.1 Scope of Definition of Green Building. 1.2 Benefits of Green building. 1.3 Components/features of Green Building. 1.4 Site selection, Energy Efficiency, Water efficiency, Material Efficiency, Indoor Air 1.5 Material and construction techniques, roofs, walls, fenestration and shaded finishes, advanced passive heating and cooling techniques, waste reduction during construction	08	20
2	Energy Audit and Environmental Impact Assessment (EIA) : 2.1 Energy Audit: Meaning, Necessity, Procedures, Types, Energy Management Programs. 2.2 Environmental Impact Assessment (EIA): Introduction, EIA regulations, Steps in environmental impact assessment process. 2.3 Benefits of EIA, Limitations of EIA, Environmental clearance for the civil engineering projects.	08	20
3	Energy and Energy conservation: 3.1 Renewable Energy Resources: Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Biomass Energy 3.2 Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels. 3.3 Energy conservation: Introduction, Specific objectives, present scenario, Need of energy conservation. 3.4 LEED India Rating System and Energy Efficiency.	06	12
4	Green Building Material : 4.1 Principles: Principles and planning of Green building. 4.2 Features: Salient features of Green Building, Environmental design (ED) strategies for building Construction. 4.3 Process: Improvement in environmental quality in civil structure. 4.4 Materials: Green building materials 4.5 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.	10	24

5	Rating System : 5.1 Introduction to (LEED) criteria. 5.2 Indian Green Building council (IGBC) Green rating. 5.3 Green Rating for Integrated Habitat Assessment. (GRIHA) criteria. 5.4 Heating Ventilation Air Conditioning (HVAC) unit in green Building. 5.5 Functions of Government organization working for Energy conservation and Audit (ECA) 5.6 National Productivity council(NPC) 5.7 Ministry of New and Renewable Energy (MNRE). 5.8 Bureau of Energy efficiency (BEE)	10	24
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COURSE OUTCOME:

After completing this course, student will be able to:

1. Identify various requirements for green building.
2. Use different steps in environmental impact assessment.
3. Relate the construction of green building with prevailing energy conservation policy and regulations.
4. Supervise the construction of green building construction using green materials.
5. Focus on criteria related to particular rating system for assessment of particular Green building.

LIST OF PRACTICAL:

SR. No.	Experiment / Exercises
1	Visit any buildings in your locality identify the relief and legal provision follow for control of pollution and submit your observation report.
2	Inspect your institute building and submit an action plan for improving the indoor and outdoor environmental quality.
3	Estimate the capacity of the solar plant required for your institute building on the basis of the total electricity consumption data available from concerned department.
4	Visit to the nearby hydroelectric power plant and prepare a report on your observation with respect to generation of energy with relevant sketches whenever required.
5	Visit to the nearby solar energy plant and prepare a report on your observation with respect to generation of energy with relevant sketches whenever required.
6	Inspect any conventional building in your area to suggest the action plan for converting it into green building with necessary legal provision to be followed.
7	Visit the site for assessment of green building with relevant rating system and submit your findings in the form of a report.

LIST OF REFERENCES:

Sr.no.	Title	Author
1	Non-conventional Energy Resources	D S Sreevasthava - New Age International Publishers, New Delhi.
2	Energy Technology	O.P. Gupta - Khanna Publishing House, New Delhi
3	Handbook of Green Building Design and Construction	Sam Kubba - Butterworth-Heinemann
4	Green Building - Project Planning and Cost Estimating	Means R S - John Wiley & Sons
5	Handbook of green building	Indian green building council