GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Minor Degree: Construction Technology
Subject Code: 115AC02
Subject Name: Green Building Technology

Type of Course: Minor Degree (Course 4)

Prerequisite: Basics of Civil Engineering, Building Construction,

Rationale: The pollution created during construction and operation of dwelling units has the answer of green technology. The pollution described in different terms can be controlled effectively by adopting green technology at building level and further at society / locality city / town level. The courses includes basic information on green building technology. Water, energy and waste are main contributors towards pollution along with the construction procedures. The future of construction is adoption of green technology for maintaining pollution free environment.

Teaching and Examination scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	0	30	0	100

Content:

Unit No	Course Content	No of Hours	Mapped CO
1	**Introduction:** Definition, typical features and benefits of green buildings towards sustainable development. Green building rating systems – GRIHA, IGBC and LEED, criteria for green buildings as per these rating systems	5	CO 1
2	**Site selection and planning:** Criteria for site selection, preservation of landscape and control of soil erosion, orientation of building façade to enhance comfort, day lighting, ventilation, etc.	5	CO 1
3	**Water conservation and efficiency:** Rainwater harvesting methods for roof & non-roof area, introduction to efficient plumbing systems, water metering and waste water treatment, recycle and reuse systems.	6	CO 2
4	**Energy Efficiency:** Impact to environment due to construction of buildings.	10	CO 2

	efficient lighting technologies, energy efficient appliances for heating and air-conditioning (HVAC) systems in buildings, use of materials with zero ozone depleting potential (ODP), harvesting of wind and solar energy, concept of net zero buildings,		
5	**Building materials for safe and sustainable system:** Reduce the embodied energy in building materials with the use of local building materials and natural renewable materials like bamboo, timber, rammed earth, stabilized mud blocks, etc., justify its suitability as building component for various loading conditions. Use of materials with recycled content such as pozzolana cements, fly ash bricks, and materials from agro and industrial waste. Determination of its mechanical properties and durability through testing.	12	CO 3
6	**Waste Management:** Handling of construction waste materials, reuse of waste and salvaged materials separation of household waste, biomass resources of buildings and its utilization.	6	CO 2
Total Hrs.		**42**	

Course outcome:

No	Course Outcomes	RBT Level*
01	Explain the features, benefits, ratings and site selection for green buildings	UN, AP
02	Illustrate the efficient water conservation, energy sources and waste management systems for green buildings with the use of sustainable materials.	UN, AP
03	Analyze the structural safety and sustainability of materials used for construction of green buildings.	UN, AP, AN

Reference Books:

1) IGBC Green Homes Rating System, Version 2.0., Abridged reference guide, 2013, Indian Green
Building Council Publishers.
2) GRIHA version 2015, GRIHA rating system, Green Rating for Integrated Habitat Assessment.
3) Alternative building materials and technologies by K.S. Jagadish, B.V. Venkatarama Reddy and K.S. Nanjunda Rao.
4) Non-Conventional Energy Resources by G. D. Rai, Khanna Publishers.
5) Sustainable Building Design Manual, Vol.1 and 2, TERI, New Delhi 2004.

6) Mike Montoya, Green Building Fundamentals, Pearson, USA, 2010.
7) Energy Efficient buildings in India, Mili Majumdar, Tata Energy Research Institute.

List of Experiments/Tutorials:

Tutorials

1) Green systems
2) Energy efficiency
3) Water conservation
4) Sustainable system
5) Case study

Major Equipment/Software:

Green building studio (GBS) by Autodesk

List of Open Source Software/learning website:

https://nptel.ac.in/