GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Minor Degree Smart Cities
Semester – V
Subject Code: 115AF01
Subject Name: Sustainable Smart City

Type of course:

Prerequisite: Develop knowledge, understanding, and critical thinking related to smart, sustainable urban development

Rationale: Understand concepts and models of 21st century green and smart cities; know current international strategies regarding sustainable development of urban areas

Teaching and Examination Scheme:

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

Content:

Sr. No.	Content	Total (Hrs)
1	**Introduction:** The evolution of cities up to the present day: social, political and spatial planning models, Urbanisation and its impacts on cities, Urban evolution in India, Changing patterns of urban growth, Quality of life in the city.	10
2	**Efficiencies and inefficiencies in cities; challenges and opportunities:** Eco challenges in the contemporary cities; Principles of green and smart cities; International initiatives including UN and EU level; Corporate social and environmental strategies in cities;	10
3	**Fundaments of sustainable development;** Sustainability and "sustainable development, Climate change indicators and their meaning for cities; ,Green technologies in cities; Green buildings and ecological footprint., Green Infrastructure, Urban sustainability foundations, models, & theories	10
4	**Energy efficient city services:**	15

	Role of local authorities and public participation in shaping the cities; Livability, place making and walk ability; City services: utilities (water, energy and communications), public street lighting, roadways and traffic, public transport, signage, environmental quality, cleaning of public spaces, waste and sewage management, maintenance, The impact of ICT on the social fabric, on the management of cities and their innovation potential, Guidelines- LEED, GRIHA, IGBC, USGBC	

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
05 %	25 %	20 %	25 %	10 %	15 %

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and 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 Books:

1. How Green is Cities? By Dimitri Devuyst, Colombia University Press, New York
2. Sustainability Science and Engineering Vol 1, By Martin A. Abraham (editor) Elsevier Publication
3. www.smartcitiescouncil.com
4. City Region 2020, by Joe Ravetz, Earthscan Publication Ltd, London, 2000.

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Course Outcome:

No.	Course Outcomes	RBT Level*
1	Student will learn how to implement sustainability in planning process at different spatial scales.	UN, AP
2	Study the guidelines, system, principles and practice of sustainable development, within the context of planning	UN
3	Learn different tools of sustainability planning and examine the core challenges relating to the foundation of sustainable smart cities	UN, AN
4	Understand concepts and models of 21st century green and smart cities; know current international strategies and energy conservation techniques regarding sustainable development of urban areas	AN, EL, CR
5	Develop knowledge, understanding, and critical thinking related to smart, sustainable urban development as well Indian scenario	AN, AP, CR

List of Experiments:

1. **Study of IGBC Guideline in context to energy conservation.**

a. Prepare a report

2. **Smart building with GRIHA criteria**

a. Understanding norms and standards of GRIHA
b. Developing smart building case study using GRIHA criteria

3. **Smart building with LEED criteria**

a. Understanding norms and standards of LEED
b. Developing smart building case study using LEED criteria

4. **Preparing a case study and model preparation on smart city.**

a. Prepare a list of 100 smart cities and finalize one potential smart city
b. Different criteria for smart cities and their progress report on any one smart city
c. Preparing a detailed report on a case study where smart materials and smart construction techniques have been used.