

Course Title: Sustainable Built Environment				
Course code: UES 201	No. of credits: 3	L-T-P: 30-15-0	Learning hours: 45	
Pre-requisite course code and title (if any): None				
Department: Natural and Applied Sciences				
Course coordinator:		Course instructor:		
Contact details:				
Course type: Major		Course offered in: Semester 3		
<p>Course Description: This course explores the principles and practices of creating sustainable urban environments, focusing on how to design and manage urban spaces. The students will delve into the key components of modern built environments, including urbanism principles, transportation systems, energy use, and the crucial role of blue green infrastructure. Additionally, the course explores nature-based solutions to address the challenges of climate change within urban contexts. Through this interdisciplinary approach, students gain the knowledge and skills needed to contribute to the creation of resilient and sustainable urban environment.</p>				
<p>Course objectives The course seeks to instil in students a fundamental grasp of:</p> <ul style="list-style-type: none"> • How buildings and built infrastructure impact associated ecological systems. • Green building principles and sustainable design practices. • Concept of urbanism and various components of urban systems. • Sustainability principles and nature-based solutions (NBS) for solving problems in urban systems. 				
Course content				
Module	Topic	L	T	P
1	Introduction to Urbanism and Modern Built Environment			
	<p>This module provides a comprehensive overview of urban environments, focusing on key aspects. Students will explore the diverse characteristics of urban areas, ranging from megacities to small towns, and examine the components comprising the built environment, including infrastructure, architecture, and public spaces.</p> <p>Definition of sustainability, evolution of sustainable design, importance of sustainability in built environment, types of urban areas and their characteristics, components of urban built environment, fundamental principles of urban design, including scale, density, connectivity, and mixed land use, challenges associated with rapid urbanization.</p>	6		
2	Sustainable Transportation & Urban Mobility			
	<p>This module offers a holistic exploration of sustainable transportation and logistics. Students will delve into the diverse array of sustainable transportation modes including public transit, cycling, walking, and electric vehicles, analyzing their environmental and social benefits. The topics covered in this module will be:</p> <p>Introduction to sustainable transportation, sustainable transportation modes, smart transportation systems, pedestrian friendly urban design, policy framework for sustainable transportation, green transportation policies and regulation, sustainable freight and logistics, case studies</p>	8	5	
3	Energy			
	<p>This module offers a comprehensive exploration of sustainable energy solutions tailored to urban environments. Students will get acquainted to key topics including energy efficiency and sustainable urban energy systems.</p>	6	5	

	Energy efficiency in buildings, renewable energy integration, smart grids and energy management, sustainable urban energy systems, case studies involving successful projects showcasing energy-efficient buildings, renewable energy integration strategies, and sustainable communities			
4	Green Spaces			
	This module provides an in-depth exploration of the concept of urban green spaces. Students will explore the importance of green spaces in urban environments for enhancing quality of life, promoting biodiversity, and mitigating environmental impacts. Introduction & typologies of green spaces, concept of urban green spaces, garden city model and principle of intelligent urbanism, indicators for measuring green growth, policy issues for green growth and green spaces, field visits and case studies.	4		
5	Nature Based Solutions			
	This module presents a detailed perspective on nature-based solutions (NBS) and their role in addressing challenges of urban development. Students will examine the effectiveness of these NBS in enhancing environmental quality, mitigating climate impacts, and promoting sustainable urban living. Blue green spaces, shade trees, green roofs and vertical greening systems, indicators for assessing the effectiveness of nature-based solutions and related knowledge gaps, green infrastructure for disaster risk reduction, case studies based on advance mainstreaming of nature-based solutions in the development of new residential areas.	6	5	
	Total	30	15	0
Evaluation criteria				
<ul style="list-style-type: none"> • Minor Test 1: Written test [at the end of teaching of modules 1 and 2] -- 20% • Minor Test 2: Written test [at the end of teaching of modules 3 and 4] -- 20% • Major Test: Written test [at the end of the semester, full syllabus] -- 40% • Assignment: 20% 				
Learning outcomes				
Upon completion of the course, the students will be able to				
<ul style="list-style-type: none"> • Apply knowledge of sustainable materials, energy efficiency, and green infrastructure in the development of environmentally responsible built environments. [Minor Test 1, • Minor Test 2, Tutorials/Assignments, Major Test] • Understand principles and strategies for minimizing environmental impact and promoting resilience in architectural design and urban planning. [Tutorials/Assignments, Major Test] 				
Pedagogical approach				
<ul style="list-style-type: none"> • The course will be delivered through class lectures and tutorials. • The course will focus on classroom discussions, case studies and assignment/field trip which help them to make this course more robust and fruitful. 				
Reading resources				
<ul style="list-style-type: none"> • Iyer-Raniga, U. (Ed.). (2021). <i>Sustainability in the Built Environment in the 21st Century: Lessons Learned from India and the Region</i>. Springer Nature. • Begum S. and Ahmed Al Shamma'a (2015). <i>The Sustainable Built Environment: Technical, managerial, legal and economic aspects</i>. Palgrave Macmillan; New edition. • Loftness, V (2020). <i>Sustainable built environments: introduction</i>. Sustainable built environments, 16. Springer, New York, NY • Atkinson, C., Yates, A., & Wyatt, M. (2009). <i>Sustainability in the built environment: An introduction to its definition and measurement</i>. Watford: IHS BRE Press. • Langston, C. (2008). <i>Sustainable practices in the built environment</i>. Routledge. Taylor & Francis L • Santamouris, M. (2013). <i>Energy and climate in the urban built environment</i>. Routledge. Taylor 				

Francis Ltd

- Rowe, P. G., & Hee, L. (2019). *A City in Blue and Green: the Singapore story*. Springer.

Journals

- Sustainable Cities and Society, Elsevier
- Sustainable Futures, Elsevier

Student Responsibilities

The students must prepare with readings suggested during the class and ensure timely assignment submission. They are also expected to participate and further strengthen their understanding of concepts through classroom discussions.

Course Designed by:

- Dr. Adil Masood, Assistant Professor, Department of Natural and Applied Sciences, TERI School of Advanced Studies, New Delhi
- Dr. Amit Singh, Assistant Professor, Department of Natural and Applied Sciences, TERI School of Advanced Studies, New Delhi

Course Reviewed by:

- Dr. Mohammad Saquib, Associate Professor, Faculty of Architecture & Ekistics, Jamia Millia Islamia University, New Delhi
- Dr. Abdul Halim Babbu, Associate Professor, Faculty of Architecture & Ekistics, Jamia Millia Islamia University, New Delhi