

INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)
SEMESTER	7
COURSE TITLE	SUSTAINABLE DESIGN STRATEGIES
COURSE CODE	01CI0720
COURSE CREDITS	3

Objective:

- 1 To analyze sustainability principles across various disciplines and apply them to everyday life
- 2 To evaluate global efforts and frameworks for tackling climate change and developing solutions
- 3 To design and assess built environments using scientific principles and sustainability rating tools
- 4 To apply UN SDGs and a systemic approach to analyze the environmental impact of built environments

Course Outcomes: After completion of this course, student will be able to:

- 1 Evaluate and apply sustainability across disciplines for real-world solutions.
- 2 Analyze global frameworks and design context-specific strategies for climate change mitigation.
- 3 Integrate scientific principles and sustainability tools to design efficiently built environments.
- 4 Use UN SDGs and systemic analysis to assess the environmental impact of buildings.

Pre-requisite of course:Basics of Environmental Studies.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction: Sustainability in Industrial Design and Built Environments Strategies for Sustainable Design – Introduction, Various Perspectives of Sustainability, Spheres of Energy Efficient/Green/Environmental/Sustainable Designs	6

Contents : Unit	Topics	Contact Hours
2	ESE Aspects of Sustainability and Climate Change Mitigation Environmental Sustainability, Social Sustainability and Economic Sustainability, Climate Change Mitigation, Future of Human Habitation Design	5
3	Current National and International Scenario of SD and Dependence on Energy Relevance of Sustainable Design in Modern Context, Built Environment and Energy Consumption, Dependence of Building Design on Energy, Current Indian and International Scenario of Sustainable Design	4
4	Alternative Solutions for Health of Ecosystem Designing Strategically for Preventing pollution: Air, Water, Soil, Noise, Light Radiation, etc., Low Environmental Impact, Thinking for Alternatives through Systemic Design, Consumption and Commercial Lifestyle	6
5	EIA, Policy, Lifecycle Analysis, Growth, Development and 3R's for Consumption Environmental impact Assessment, Lifecycle Analysis, Life Cycle Assessment – Detailed Methodology and ISO Framework (Detailed Example on LCA Comparisons, LCA Benefits and Drawbacks, Historical Development and LCA Steps from ISO Framework), Growth and Development in Construction and Allied Sectors, Policy Push in Real Estate and Manufacturing Sectors, Policy Push for Development of the Low Economic Regions, Sustainable Building Materials, Reduce/Reuse/Recycle	10
6	NBC, ECBC, GRIHA, UN SDG and System Design tools such as SPSS, MSDS by LeNS National Building Code 2016 - Part 11 and Energy Conservation Building Code, Guidelines for Building Design by SA Methods: GRIHA, UN SDG for Sustainable Development, LeNS Design Method, and Tools such as SPSS, MSDS, DE, International Conventions, Laws and Emerging Technologies for SD	4
7	Vernacular and Responsive Design Vernacular Design Case Example, Climate Responsiveness, Need for Innovation in Design Process, Design for Net-Zero Energy, Lighting, Ventilation, Views and Human Comfort	4
8	Design for Sustainability and Nature as Inspiration D4S with Inspiration from Nature, D4S for Optimization of Manufacturing, Strategies for Sustainable Design	3
Total Hours		42

Textbook :

- 1 Ecological Design, Rottle, Nancy., Yocom, Ken., AVA Book, Switzerland, 2010

References:

- 1 Innovation Inspired by Nature, Innovation Inspired by Nature, Benyus, Janine M. Biomimicry, William Morrow Paperbacks, 2002
- 2 Design for Environmental Sustainability, Design for Environmental Sustainability, C. Vezzoli and E. Manzini, Springer – Verlag, London, 2008

Suggested Theory Distribution:

The suggested theory distribution as per Bloom’s taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
5.00	10.00	30.00	30.00	15.00	10.00

Instructional Method:

- 1 Prerequisite of the course and its pattern shall be discussed on the commencement of the course
- 2 Lectures shall be conducted in the classroom using various teaching aids
- 3 Presence in all academic sessions is mandatory which shall carry 5% marks of the total internal evaluation
- 4 At the end of each unit/topic an assignment based on the course content shall be given to the students which shall carry 5% weightage for timely completion and submission of the assigned work

Supplementary Resources:

- 1 https://onlinecourses.nptel.ac.in/noc24_de01/preview
- 2 https://onlinecourses.swayam2.ac.in/aic19_ge05/preview