BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

SECOND SEMESTER 2020-21
COURSE HANDOUT

Date: 18.01.2021

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

Course No : CE F423
Course Title : **Green Buildings and Energy Conservation**
Instructor-in-Charge : **Rajiv Gupta**
Instructor(s) :
Tutorial/Practical Instructors:

1. Course Description: Climate zones and sun path diagram, thermal comfort, heat flow through building materials, energy efficient building design factors like site planning, plan form and orientation, construction techniques, materials and finishes, natural day lighting and ventilation strategies, thermal performance of building elements, simple techniques to recycle and reuse water, harvest rainwater, green building rating system, case studies of traditional architecture and contemporary buildings, building design using AUTOCAD

2. Scope and Objective of the Course: The course introduces green architecture and intends to equip students with technical knowledge of energy-efficient green building. The course covers various aspects of green architecture like climatology, passive solar architecture, water management. The course will also guide students, through projects, to apply concepts and ideas for the design of a green building.

3. Text Books:

T1. Krishnan A., Baker N., Yannas S. and Szokolay S. (Ed.). Climate responsive architecture, a design handbook for energy efficient buildings. Tata McGraw–Hill Publishing Company: New Delhi. 2001

T2. The Energy and Resources Institute and ICAEN (Institut Catala d'Energia). Sustainable building design manual (Volume 2). The Energy and Resources Institute: New Delhi. 2004.

4. Reference Books:

R1. Olgyay V. and Olgyay A. Design with climate; bioclimatic approach to architectural regionalism. University Press: New Jersey. 1963.

R2. Duffie J. and Beckman W. Solar engineering of thermal processes. Second edition. John Wiley & Sons: New York. 1991.

R3. Bureau of Indian Standards. SP:41, Handbook on functional requirements of buildings (other than industrial buildings). First reprint. Bureau of Indian Standards: New Delhi. 1995.

R4. Indian Green Building Council. LEED-India, Green building rating system, abridged reference guide for new construction and major renovations (LEED India NC), version 1.0. Indian Green Building Council: Hyderabad. 2007.

R5. The Energy and Resources Institute. TERI-Green Rating for Integrated Habitat Assessment. The Energy and Resources Institute: New Delhi. 2006.

Journals: Energy and Buildings, Building and Environment, Elsevier Publications.

5. Course Plan:

Module No.	Lecture Session	Reference	Learning outcomes
1-2	Climate zones, elements of building design	T1, R1, R3	Climate and architecture
3-6	Solar angles	T1, R2	Sun path diagram
6-7	Indices of thermal comfort, psychrometric chart, bioclimatic chart	R1, R3	Thermal comfort and heat flow
8-9	Vernacular buildings in different climate zones	T1, journals	Traditional architecture and climate
10-11	Landform, topography, vegetation, water bodies	T1, T2, R1,	Site planning
12-13	Orientation, S/V ratio, P/A ratio	T1, R1	Plan form
14-17	Techniques for roof, wall and foundations	T1, T2, R1, R3	Construction techniques
18-19	Material properties	T1, T2, R1	Construction materials
20-23	Design and placement of openings	T1, R1, R3	Ventilation and day lighting
24-26	Heat flow through different building elements	T1, R3	Calculation of thermal conductance
27-29	Techniques to recycle, reuse and harvest water	T1, T2	Water management in buildings
30-32	Cost of building, operation and maintenance	T2	Life cycle cost
33-35	Evaluation criteria of LEED, TERI GRIHA	R4, R5	Green building rating system
36-39	Case studies in different climate zones	T1, T2	Contemporary green buildings
40-43	Elements of building design	Class notes	Building design using AUTOCAD

6. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Test	90 Min.	25		CB/ OB
Comprehensive Examination	120/ 180 MTS	35	03.05.2021 FN	OB/ CB

Surprise quiz (Best 5 out of 7)	30x5	20		
Project	Conti....	15		

7. Chamber Consultation Hour: TTH: 4-5 PM

8. Notices: Nalanda only

9. Make-up Policy: Prior permission is must

RAJIV GUPTA
Instructor-in-charge
Course No.