Date: 15/01/16

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**

Scope and Objectives:

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.

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

Textbooks:

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.

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.

Course Plan:

Lecture No.	Learning Objectives	Topics to be Covered	Reference
1-2	Climate and architecture	Climate zones, elements of building design	T1, R1, R3
3-6	Sun path diagram	Solar angles	T1, R2
6-7	Thermal comfort and heat flow	Indices of thermal comfort, psychrometric chart, bioclimatic chart	R1, R3
8-9	Traditional architecture and climate	Vernacular buildings in different climate zones	T1, journals
10-11	Site planning	Landform, topography, vegetation, water bodies	T1, T2, R1,

12-13	Plan form	Orientation, S/V ratio, P/A ratio	T1, R1
14-17	Construction techniques	Techniques for roof, wall and foundations	T1, T2, R1, R3
18-19	Construction materials	Material properties	T1, T2, R1
20-23	Ventilation and day lighting	Design and placement of openings	T1, R1, R3
24-26	Calculation of thermal conductance	Heat flow through different building elements	T1, R3
27-29	Water management in buildings	Techniques to recycle, reuse and harvest water	T1, T2
30-32	Life cycle cost	Cost of building, operation and maintenance	T2
33-35	Green building rating system	Evaluation criteria of LEED, TERI GRIHA	R4, R5
36-39	Contemporary green buildings	Case studies in different climate zones	T1, T2
40-43	Building design using AUTOCAD	Elements of building design	Class notes

Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage	Date, Time	Nature of Component
1	Mid-semester Test	90 min.	30	14/3 9:00 - 10:30 AM	CB
2	Project	Continuous	25		-
3.	Surprise quiz	30x3	10	-	CB
4	Comprehensive Examination	180 min.	35	3/5 FN	OB/CB

Chamber Consultation Hour: To be announced in class.

Notices: Concerned notices will be displayed on Civil Engineering Department notice board.

Make-up Policy: Prior permission needs to be obtained for make-up.

Instructor-in-charge

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