

Smart/Emerging/Sustainable Systems

Thursdays 4-7pm - Room 225
Ilaria Mazzoleni, Instructor - imsciarc@yahoo.com

“ A building should be designed so as to minimize the use of new resources and, at the end of its life, to form the resources for other architecture”
(R. & B. Vale)

Course Intent

The seminar is an introduction to sustainable design techniques, including an analysis of the construction process starting from material selection, use and dismantling of building components, and integration of the engineering systems.

Rising awareness of climate changes and fast depletion of natural resources calls for a new set of parameters for architecture and the built environment with specific attention to the way we design and construct buildings. In the natural closed cycle there is no such thing as ‘waste’, but merely resources that are out-of-place. The appropriation and reinvention of uses for these resources constitute our responsibility and challenge.

Consideration of social, economic and climatic conditions, together with re-examination of vernacular wisdom in architecture offers articulated passive responses to human comfort requirements. The course will take a case study approach to further understand some of these passive design principles.

Today, we design and engineer dynamic systems to mediate the interaction between man and nature. This course illustrates how emerging active technologies can assist and enhance the evolution of an energy-efficient society.

Students will be exposed to the theoretical principles explained through case studies and field trips. The project research will be a means by which they will be able to understand, deepen and develop their specific interests.

Logistic and Grading

Attendance is mandatory to all lectures, presentations and field trips, as per school policy.

Notebook: each student must have a dedicated notebook for the seminar which will be periodically reviewed and graded.

The grade will be based on the following percentages:

2 projects @ 40% each
notebook, attendance and participation to class discussion and presentation 20%

Late project presentations will not be accepted and will not be graded.

Projects

Project 1: Individual. Life Cycle Analysis of a material.

Project 2: In team of (2) students. Case Study Analysis of passive and active systems of an existing building.

Each Team will present the project to the whole class for discussion.

Submittal requirements:

- Bound copy of the project (format 11'x17' hor) at the end of each presentation.
- CD containing all projects must be submitted the day of the last presentation (12/08/05).

Bibliography

Mandatory Reading:

McDonough W. & Braungart M., *Cradle to Cradle/Remaking the Way We Make Things*, North Point Press, 2002

Additional readings include but are not limited to the bibliography indicated below:

Lopez Barnett D., *A Primer on Sustainable Building*, Rocky Mountain Institute, 1995

"Environmental Building News; a Monthly Newsletter on Environmentally Responsible Design and Construction", E Build, Inc.

Public Technology, Inc. & the U.S. Green Building Council, *Sustainable Building Technical Manual: Green Building Practices for Design, Construction, and Operations*, Public Technology, Inc. 1996

American Institute of Architects, *Environmental Resource Guide*, John Wiley+Sons, 1996

Van Der Ryn S. & Cowan S., *Ecological Design*, Island Press, 1995

Blumberg M.S., *Body Heat*, Harvard University Press, 2002

Brown G.Z., *Sun, Wind, Light: Architectural Design Strategies*, John Wiley+Sons, 2001
Behling S. & S., *Solar Power*, Prestel, 2000
Yeang K., *The Green Skyscraper*, Prestel, 2000
Beukers A. & Van Hinte E., *Lightness*, 010 Publishers, 1999
Kieran S. & Timberlake J., *Refabricating Architecture*, McGraw-Hill, 2004

Course Outline

09/08 Lecture: Course Overview
Project 1: Introduction

There is no waste in nature, that's smart!

09/15 Life Cycle Analysis and Embodied Energy
Project 1: Selection and discussion
09/22 Lecture: Sustainable Design Principles
Project 1: Review
09/29 Lecture: Indoor Human Environment
Project 1: Review

“Reducing” is sustainable

10/06 Final Presentation Project 1
10/13 Lecture: Passive Technologies
Project 2: Introduction
10/20 Field Trip: Case study
10/27 Lecture: Active Technologies
Project 2: Discussion/Review

Exploring emerging systems

11/03 Field Trip: Case study
11/10 Lecture: Assembly and disassembly
Project 2: Review
11/17 Lecture: Lightness/ Prefabrication
Project 2: Review
11/24 No Class – Happy Thanksgiving
12/01 Lecture: Transfer Technology
Project 2: Final Review
12/08 Final Presentation Project 2

Note: the schedule is subjected to revision and change.