Sustainability in Construction, Proj_Mgt 441
Master of Project Management Program, Northwestern University
Instructors:
Helen J. Kessler, FAIA, LEED AP and Lois Vitt Sale, AIA LEED Faculty
Winter 2011

Course Reading Material:
_Ishmael_ by Dan Quinn will be discussed at the first session – please read this book before the first class


Week 1: Overview of Sustainability – January 4th  (Helen and Lois)
The introductory class will include a discussion of sustainability, an explanation of the class and coursework. We will engage you in a discussion of your understanding of the topic and ask for examples of policies and practices with which you are familiar. Come prepared to talk and to bring ideas that you would like to discuss in class! We will also discuss Ishmael by Daniel Quinn, focusing on human interactions with “nature.”
_Sustainable Construction_ – Chapters One and Two

Week 2: Landscape and Infrastructure, Sustainability from the Ground Up – January 11th  (Lois)
Many of the environmental impacts associated with the built environment can be caused or avoided by site selection. This week, we discuss heat island, storm water, watersheds, the function of wetlands, open space preservation, carbon impacts of commuting, green roofs – their benefits and costs. Discussion is centered on defining specific site impacts and recognized best practices to mitigate those impacts. Case studies of real world projects are used to reinforce principles discussed.
_Sustainable Construction_ – Chapter Six

Course Requirements
Sustainability in Construction
Week 3: **Energy Efficiency and Renewable Energy – January 18th** (Helen)
With the concerns for energy availability and security, during this week we discuss how and where energy is used around the world, energy efficiency opportunities in buildings, including a discussion of a systems approach and use of energy modeling, how the building envelope may be viewed as a part of the mechanical system, daylight as a fundamental part of the lighting system, HVAC systems as a means, not an end, renewable energy and advanced energy solutions.

Quiz #1, Sustainable Sites
*Sustainable Construction* – Chapter Seven

Week 4: **Water – January 25th** (Lois)
Fresh water supply is a serious issue for much of the developed world and is becoming more and more pressing for many areas in the US. This week we will focus on the basic elements in the water discussion – is there enough and is the water to which we have access safe? We will study water at the system level to understand issues beyond the project limit line and also focus on water conserving technologies that can preserve our water resources. Graywater, blackwater, and water conserving technologies will be discussed with case studies of implemented solutions.

Case Study Project Selected (submitted electronically, by noon)
Quiz #2, Energy
*Sustainable Construction* – Chapter Eight

Week 5: **Integration of Systems and Building Commissioning – February 1st** (Helen)
Using an integrated approach to building design and whole systems thinking are key to design of effective buildings. We will discuss why it is important that all disciplines work together early in a project, watch a video case study on using an integrated approach to design and discuss building commissioning – what it is, what it is not, why it is done, roles and responsibilities, costs and benefits.
*Sustainable Construction* – Chapters Four, Five (optional) and Twelve

Week 6: **The lexicon of a green material – February 8th** (Lois)
These days you can’t open a newspaper or a magazine without being confronted by a claim of a green product. In this class, we will discuss what makes a material green, how to ask a material supplier the right
questions and how to consider whether a material is, in fact, truly green. We will discuss recycled products, embodied energy, life cycle of a material, and rapidly renewable materials. Samples of real products that embody the attributes we discuss will be passed around the classroom.

Quiz #3 on Materials at end of class
*Sustainable Construction* – Chapter Nine

**Week 7:** Indoor Environmental Quality – February 15th (Helen)
We spend more than 90% of our time indoors, so good indoor environmental quality is critical. In this session, we will discuss air quality – understanding what makes good air and environmental quality; terminology – such as volatile organic compound and sick building syndrome; various types of ventilation systems such as displacement and natural ventilation; causes of indoor pollution; construction indoor air quality management; daylighting – how it helps, how it hinders environmental quality.

Progress Report on Case Study Interviews and Data Collection - Planned or In Progress, Case Study Outline Due (submitted electronically by noon)

*Sustainable Construction* – Chapter Ten

**Week 8:** Construction Waste Management – February 22nd (Lois)
Construction Waste comprises 40 percent of the waste in our landfills. Landfills produce methane, a greenhouse gas that is much more potent than carbon dioxide. We will discuss issues surrounding waste in the construction industry, discuss how to formulate and implement a successful waste management plan and how design can influence the amount of waste produced during the construction of a project. Other issues we will discuss include waste to energy, composting and electronic recycling.

Quiz #4, Commissioning and Indoor Environmental Quality
*Sustainable Construction* – Chapter Eleven

**Week 9:** Use of the LEED Rating System – March 1nd (Helen)
LEED is becoming ubiquitous in the design and construction of new buildings. This week, we will discuss the LEED rating system, how it is used, strengths, weaknesses, examples, green building and LEED impacts on the construction industry. A panel of team members who have designed and built a LEED project will be invited to share their insights and experiences with the class.
Case Study Due (submitted electronically by noon)

Week 10: Student Presentations – March 8th
Students give 10 to 15 minute presentations on their selected case study

Week 11: Student Presentations in lieu of Final Exam – March 15th
Students give 10 to 15 minute presentations on their selected case study

All assignments are due electronically – emailed to the addresses listed on page one to both Helen and Lois. All assignments are due by noon on their due date. On the subject line of your email – please add “NU” to facilitate our ability to find your emails.

Student Presentation/Case Studies

Each student will write a case study on a project that is part of the USGBC Illinois Regional Green Building Case Study Project. See http://www.usgbc-chicago.org/?page_id=2905, for the report and case studies from 2009. A list of projects for which case studies may be written will be made available to you by January 11. Case study format should be substantially the same as the format for the USGBC Illinois Case Study Project. It is anticipated that your case studies will be included in the final 2011 report. Case studies are due on March 1 by noon.

Each student will make a class presentation of 10 to 15 minutes summarizing the highlights of the case study projects.

Grades:

4 quizzes from book 40%
Case Study/Presentation 40%
Class Participation 20%

Suggested Resources

- Greening Our Built World, Costs, Benefits and Strategies by Greg Kats
- Confessions of a Radical Industrialist by Ray Anderson
- Blessed Unrest by Paul Hawken
- Green Recovery by Andrew Winston
- Hot, Flat and Crowded by Thomas Friedman
- Natural Capitalism by Paul Hawken, Amory Lovins, and L. Hunter Lovins
- Ecology of Commerce by Paul Hawken
• **Regenerative Design Techniques: Practical Applications in Landscape Design** by Pete Melby and Tom Cathcart
• **Biomimicy** by Janine Benyus
• **Cool Companies** by Joe Romm
• **Ancient Sunlight** by Thom Hartmann
• **The Future of Life** by E.O. Wilson
• **Mid-Course Correction** by Ray Anderson
• **Cradle to Cradle** by Bill McDonough and Michael Braungarten
• **The Philosophy of Sustainable Design** by Jason McLennan
• **Planting Green Roofs and Living Walls** by Nigel Dunnett and Noel Kingsbury
• **Eco-Economy** by Lester Brown
• **Plan B 4.0** by Lester Brown
• **Alternative Construction** by Lynne Elizabeth and Cassandra Adams
• **Green Development** by The Rocky Mountain Institute
• **Greed to Green** by David Gottfried
• **The Natural Step Story** by Karl-Henrik Robert
• **Sustainable Urbanism** by Douglas Farr
• **Sustainable Design** by Daniel Williams
• **Winning the Oil End Game** by Amory Lovins
• **Adapting Buildings and Cities for Climate Change** by Sue Roaf
• **The Sustainability Handbook** by William E. Blackburn
• **The Integrative Design Guide to Green Building** by 7Group and Bill Reed