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

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

Text: *Sustainable Construction: Green Building Design and Delivery*, by Charles J., Kibert, John Wiley & Sons, 3rd edition, 2013.

Week 1: Overview of Sustainability – (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 – (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

Week 3: Energy Efficiency and Renewable Energy – (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 – (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 – (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 – (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 – (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 – (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 – (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 –
Students give 10 to 15 minute presentations on their selected case study

Week 11: Student Presentations in lieu of Final Exam –
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 completed LEED project. Students will ask for utility and water data for their subject project and compare the actual energy usage against the Energy Usage Intensity of similar buildings in the same climate zone. Interviews with facility personnel who are responsible for building operations at the project will be required. Case studies should be broader than just an energy and water usage review and students will be required to share an understanding of the strategies used to achieve LEED certification, and lessons learned in occupancy at their subject project. Case studies are due on February 28 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
- Biomimicry 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