

SYLLABUS

BCN 6580– High-Performance Green Building Delivery Systems

Th, Periods E1-E2 (6:15 PM – 9:10 PM), RNK 215



Prerequisites: Graduate standing, BCN 6585, or instructor approval

Description: The purpose of the course is provide an overview of emerging delivery systems for high performance green buildings and the basis on which their sustainability can be evaluated. Green building assessment including US and international systems will be covered.

Key Words: Green Buildings, High-Performance Buildings, building assessment, Sustainable Construction

Method: Lectures; research papers; oral presentations; work on real world LEED, Green Globes, LBC projects; field trips; guest lectures

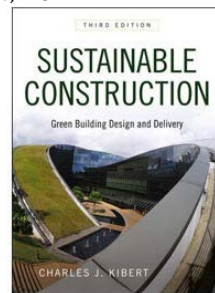
Objective: Upon completion of this course, the student will be conversant with the subject of high-performance green building design and delivery systems, the USGBC LEED suite of building assessment standards, Green Globes, and the Living Building Challenge.

Course Outline: This course is organized on a 15 week schedule with assigned readings and projects. Each module consists of readings, analyses, and exercises.

Instructor: Charles J. Kibert, 342 Rinker
MWF noon – 2:00 PM or by appointment
ckibert@ufl.edu +1 352 273 1189

Required Text: Kibert, C. J. “Sustainable

Construction: Green Building Design and Delivery,” Third Edition, New York: John Wiley & Sons, Inc., 2012



References:

Environmental Building News, monthly green building

newsletter <http://www.buildinggreen.com>

Eco-Structure, AIA, <http://www.ecco-structure.com>

GreenBuilder, <http://www.greenbuildermag.com>

Green Source, McGraw Hill Construction and BuildingGreen, <http://greensource.construction.com>

High Performance Buildings, ASHRAE publication, <http://www.HPBmagazine.com>

Class Attendance. Attendance at all class meetings is mandatory. Unexcused absences will result in a 20 point deduction.

Late Assignments. Late assignments will

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incur an immediate 10 point penalty, 10 additional point penalty for each day late. Assignments are due to the instructor by the start of class on the due date in both hard and e-copies.

Honor Policy. It is Rinker School policy that any incidence of cheating, copying, signing rosters for others, or other attempts to deceive will be penalized by course failure.

STUDENT ASSIGNMENTS AND EVALUATION

Grading: The final student grade will be a letter grade based on the percentage of the Total Points Achievable. The grades based on the percentage are as follows: The grades based on the percentage rounded to the nearest whole number are as follows:

A: 95 and up, A-: 92-94.5 B+:88-91, B: 83-87, B-: 80-82, C+: 77-79, C: 73-76, C-: 70-72, D+: 67-69, D: 63-66, D-: 60-62, E: 59 or below.

Course Requirements: The required papers and projects for this course are described below.

A. HPB Project (175 points)

1. Part 1: LEED: 50 points
2. Part 2: Green Globes: 50 points
3. Part 3: LBC : 50 points
4. Project Oral Report: 25 points

B. HPB Papers (100 points each, 25 points oral report)

1. Critique of Green Building Assessment
2. Cutting Edge of Sustainable Construction
3. Oral Report (each student gives 1 report)

C. HPB Technology Reports (25 points)

1. Technical Systems (MEP)
2. Non-Technical Systems
3. Software/Tools

D. Quizzes: 20 points each

E. Attendance: 20 points deducted for each class period missed

Total Points = 525 points + Quizzes + Bonus – Attendance

NOTES:

(1) Project is by Group, all other assignments are Individual.

(2) Bonus: Up to 20 points for outstanding project or paper.

HPB Project: LEED/Green Globes/LBC

Students will be divided into teams and each group, in consultation with the instructor, will be assigned or select a building project for application of high-performance green building approaches. This project has three components: (1) LEED and (2) Green Globes building (3) Living Building Challenges assessment systems. A 15 minute oral report by the team is required.

HPB Papers

Each student will prepare two 1,500 word papers. A hard copy and e-copy will be delivered to the instructor. A 10 minute (+/- 1 minute) powerpoint oral report will be given as directed by the Instructor.

HPB Tech Reports

Students will produce one Powerpoint oral reports: (1) Technical Systems, (2) Non-Technical Systems, and (3) (Software/Tools. Oral reports are 10 minutes with Powerpoint. An e-copy of the powerpoint will be posted to Sakai by the due date.

HPB Paper Format

Use the APA format for your papers as found at <http://owl.english.purdue.edu/owl/resource/560/01/>

Do not provide a cover page. Provide an abstract, keywords, and references. You must provide at least 10 references from authoritative sources (not the internet, not Wikipedia, not company newsletters). You can use journals, EBN, books, and other well-respected publications such as Scientific American, the New York Times, and the Economist.

DUE DATES

Tech Report 1: 1.17.2016

Paper 1: 1.31.2016

Tech Report 2: 2.14.2016

Paper 2: 2.21.2016

Tech Report 3: 3.28.2016

HPB Project - Part 1 4.4.2016

HPB Project - Part 2 4.11.2016

HPB Project - Part 3 4.18.2016

HPB Project – Oral 4.24.2016

Oral Presentations (Tech Reports): TBA

Oral Presentations (Project): TBA

Quizzes: A quiz may be given at the start of each class on the assigned tasks for that class. Students are required to complete all assignments prior to class and be prepared for in-depth discussion in class. Each quiz has a value of 20 points.

WEEKLY SCHEDULE AND ASSIGNMENTS

Each week consists of 2.5 hours of lecture and in-class activities for which you are expected to be prepared prior to attending class. There are three types of weekly reading assignments listed for each week. **Read** means to carefully digest the assigned materials and be thoroughly familiar with the content. **Scan** implies that you will quickly skim and be acquainted with the content and major. **Visit** refers to going to websites to become familiar with that organizations purpose and the types of resources and information that are available for use. You are required to complete all assignments prior to class and you may be quizzed on your knowledge of the assigned readings and tasks.

Semester Outline

Week	Description
1	Introduction to high-performance green buildings Impacts of building construction, operation, and disposal
2	Methods and tools for building assessment LEED Green Globes Living Building Challenge Florida Green Building Coalition
3	Building assessment and the green building process Design and construction relationships Project management BREEAM, CASBEE, Green Star, DGNB
4	Site and landscape strategies
5	Building energy system strategies Low Energy Buildings Renewable Energy Systems
6	Building hydrologic cycle strategies
7	Materials selection strategies Multi-attribute standards (MAS) Life Cycle Assessment
8	Indoor Environmental Quality (IEQ) analysis and strategies
9	Construction team responsibilities and controls Building commissioning strategies Site operations
10	Carbon Accounting
11	Economic issues and analysis Life Cycle Costing Business Case for Green Buildings
12	Green building codes and standards International Green Construction Code ASHRAE 189P ANSI/GG 01

Weekly Assignments

Week 1 Introduction to High-Performance Green Buildings

Learning Objectives

- Understand the concept of high-performance green buildings and the forces shaping them
- Become familiar with the advantages of high-performance green buildings
- Become exposed to sustainable construction and its principles
- Understand the concepts of whole-building design and integrated design
- Become familiar with the vocabulary of sustainable development and high-performance green buildings
- Understand the global and local environmental problems connected to the built environment

Read for next class:

- Part II Assessing High-Performance Green Buildings (textbook)
- Chapter 4 Green Building Assessment (textbook)
- EBN as assigned

Visit for next class:

- The Whole Building Design Guide website: <http://www.wbdg.org>
- The World Business Council on Sustainable Development (WBCSD) website: <http://www.wbcsd.org>
- The website of the U.S. branch of the Natural Step: <http://www.naturalstep.org>
- The International Institute for a Sustainable Built Environment (iiSBE) website at <http://www.iisbe.org>
- The website of BuildingGreen, Inc.: <http://www.buildinggreen.com>
- The BREEAM website: <http://products/bre.co.uk/breeam>
- The Florida Green Building Coalition website: <http://www.floridagreenbuilding.org>

Scan for next week:

- [Is it to easy being green?](#) USA Today, 24 October 2012
- [City's Law Tracking Energy Use Yields Some Surprises](#), NY Times, 24 Dec 2012
- [Aiming for Truly Sustainable Buildings](#), NY Times, 1 November 2013
- [A Building Not Just Green But Practically Self Sustaining](#), NY Times, 2 April 2013

Week 2 Methods and Tools for Building Assessment

Learning Objectives

- Become aware of the nature of the contemporary green building movement
- Understand the concept of building assessment
- Be aware of building assessment standards such as BREEAM, CASBEE, and Green Star

Read for Next Week:

- Chapter 5 The US Green Building Council LEED Building Rating System (textbook)
- The Living Building Challenge (v2) (Sakai)
- EBN as assigned

Scan:

- LEED-NC v3 and v4 Technical Manuals (Sakai)

Visit:

- The U.S. Green Building Council website: <http://www.usgbc.org>
- The LEED portion of the USGBC website: http://www.usgbc.org/leed/leed_main.asp

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Week 3 The LEED Building Assessment Approach, Design/construction relationships

Learning Objectives

- Become aware of the documentation requirements of LEED
- Become familiar with LEED v3 and v4
- Become familiar with the Living Building Challenge (LBC)
- Become aware of the concept of ecological design
- Learn the differences between conventional design, ecological design, and regenerative design

Read:

- Chapter 6 The Green Globes Building Assessment System (textbook)
- Part III, Green Building Design (textbook)
- Chapter 7 The Green Building Design Process
- Chapter 8, Sustainable Sites and Landscaping (textbook)
- Read about green RFP's/RFQ's at the AIA COTE website: <http://www.aia.org/cote/rfps>
- *Regenerative Design: Toward the Re-Integration of Human Systems with Nature*, David Eisenberg and William Reed, July 2003

Scan:

- The Green Globes version 2 Technical Manual (Sakai)

Visit:

- The Green Globes website at <http://www.thegbi.com>

**Week 4 The Green Globes Building Assessment System
Green Building Siting and Landscaping**

Learning Objectives

- Become aware of land use issues that affect site selection
- Become familiar with the concept of sustainable landscapes
- Understand how ecosystems can be enhanced and improved in building projects
- Become familiar with stormwater management systems for green building projects
- Learn about the issues of light pollution and light trespass
- Become familiar with the LEED-NC 2009 Sustainable Sites (SS) category

Read Chapter 9 Energy and Carbon Footprint Reduction (textbook)

Visit The Green Buildings Initiative <http://www.thegbi.org>

Week 5 Building energy system strategies

Learning Objectives

- Become aware of the energy issues connected to the built environment
- Learn about the high-performance building energy design strategy
- Become familiar with strategies for passive design
- Learn about the selection of active mechanical and lighting systems
- Become with renewable energy systems for the built environment
- Become familiar with the LEED-NC 2009 Energy and Atmosphere (EA) category

Read Chapter 10, The Building Hydrologic System (textbook)

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Week 6 Building hydrologic systems

Learning Objectives

- Become familiar with water consumption and water quality issues
- Learn about the high-performance green building hydrologic strategy
- Learn about the high-performance green building water supply strategy
- Learn about the high-performance green building wastewater supply strategy
- Become aware of approaches to improving landscaping water efficiency
- Become familiar with the LEED-NC 2009 category of Water Efficiency (WE)

Read: Chapter 11, Closing Materials Loops (textbook)

Scan [*Selecting Cost-Effective Building Products: BEES Approach*](#), Barbara Lippiatt, Journal of Construction Engineering and Management, November 1999, 448-455

Week 7 Materials Selection Strategies

Learning Objectives

- Become familiar with the issues in selecting green building materials and products
- Become familiar with priorities for selecting green building materials and products
- Learn about life-cycle assessment (LCA) of building materials and products
- (Become familiar with the concept of closing materials loops to include building deconstruction and product disassembly)

Read

Chapter 12, Indoor Environmental Quality (textbook)

Week 8 Indoor Environmental Quality (IEQ) analysis and strategies

Learning Objectives

- Become of indoor environmental quality issues and problems to include Sick Building Syndrome (SBS) and Building Related Illness (BRI).
- Become familiar with indoor environmental quality factors
- Learn about the Best Practices for indoor environmental quality
- Become aware of the issues of managing indoor environmental quality during construction
- Become familiar with the LEED-NC 2009 category of Indoor Environmental Quality (IEQ)
- Learn about site protection planning

Read:

Part III, Green Building Construction, Commissioning, Economics, and Future Green Buildings (textbook)
(Chapter 13, Construction Operations and Commissioning (textbook))

Week 9 Green Building Construction and Commissioning

Learning Objectives

- Learn the best practices for construction and demolition waste management
- Become familiar with training subcontractors on green building processes
- Learn how to reduce the footprint of construction operations
- Become familiar with the essential of building commissioning
- Learn about the costs and benefits of building commissioning
- Become familiar with the LEED-NC and GG requirements for building commissioning

Read:

- Chapter 14, Green Building Economics (textbook)
- The Business Case for Sustainable Design located at <http://www.eere.energy.gov/femp/techassist/sustainability.html>

Week 10 The Business Case for Green Building, Economic issues and analysis

Learning Objectives

- Become familiar with the business case for high-performance green buildings
- Learn how to quantify green building benefits
- Learn how to manage the first costs of green building projects
- Learn how to apply LEED support tools such as the Green Light Strategies estimating tool
- Learn about other LEED standards: LEED-EB, LEED-CS, LEED-CI, and LEED-H
- Learn about the Green Globes and FGBC building rating systems
- Learn about the cutting edge of green building and about future directions for high performance green buildings

Read: Chapter 15, Future Directions (textbook)

Scan: Cost of Green Revisited: Matthiessen and Morris, 2007 on the course website

**Week 11 Green Building Project Management & Estimating
Future directions in green high performance building technologies**

Learning Objectives

Become familiar with some of the estimating and project management issues of high performance buildings
Learn how to develop your team into a highly skilled unit that can tackle both advanced high performance building issues as well as typical day-to-day issues.

Learn about some emerging trends in HPB such as net zero energy, carbon accounting, and the emergence of life cycle assessment (LCA) and Environmental Product

Scan:

- ANSI/GBI 01-2010 “Green Building Assessment Protocol for Green Buildings,” April 2010 (at Sakai)
- ASHRAE 189P (at Sakai)
- International Green Construction Code (IgCC) (at Sakai)

**Week 12 Green building codes and standards:
International Green Construction Code
ASHRAE 189P
ANSI/GG 01**

Learning Objectives

- Become familiar with the emerging green building codes and standards
- Learn about the role of the built environment in climate change
- Learn how to apply carbon accounting to the built environment

Read: Low Carbon Routemap for the UK (2013) (Sakai)

Week 13 Carbon accounting,

Learning Objectives

- Become familiar with carbon accounting for the built environment

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Week 14 Green Building Specifications

Learning Objectives

- Learn how to develop construction project specifications that support green building

**Week 15 Presentation of course projects
GA and LEED-AP Test Preparation**

Learning Objectives

- Learn about credentials available for GG and LEED
- Become familiar with the Green Globes Professional and LEED-AP tests

CLASS SCHEDULE

Class	Date (2016)	
1	7 Jan	
2	9 Jan	Tech Report 1
3	21 Jan	
4	28 Jan	Paper 1
5	4 Feb	
6	11 Feb	Tech Report 2
7	18 Feb	
8	25 Feb	Paper 2
9	3 Mar	
Spring Break	6-13 Mar	
10	17 Mar	Tech Report 3
11	24 Mar	
12	31 Mar	HPB Project Part 1
13	7 Apr	
14	14 Apr	HPB Project Part 2
15	21 Apr	HPB Project Oral