

## **Sustainability and the Built World**

### **HP 300-001/ENS 300-003**

University of Kentucky, College of Design  
Department of Historic Preservation  
Tuesdays and Thursdays, 11:00 am to 12:15 pm  
Whitehall Classroom Building 204

Fall 2021  
3 credit hours

Professor Daniel Vivian  
100 C Bowman Hall  
daniel.vivian@uky.edu  
(859) 323-6392  
Office Hours: Tuesdays, 1:00-3:00 pm, and by appointment

#### **Course Description**

Examines the relationship between sustainability and human environments, with emphasis on building design and construction, building operations, and community planning and development. Topics considered include green building and design, smart growth, embodied energy, adaptive reuse, life cycle assessments, energy-efficient retrofitting, social and environmental justice, and the role of heritage in fashioning durable commitments to place.

#### **Overview**

Buildings account for a large percentage of annual greenhouse gas emissions. In the United States, buildings are responsible for about 40 percent of annual carbon emissions, mainly through electricity consumption. Globally, the United Nations estimates that building materials account for around 10 percent of annual carbon emissions and 25-40 percent of solid waste. Studies of greenhouse gas emissions and their role in climate change consistently emphasize the need to make design, construction, and building operations less resource intensive. But how? What technical knowledge, strategies, and policies are needed to create carbon-natural built environments? How can design, construction, and building operations figure in the process? And what about community planning and land use policy?

This course examines these and other questions in surveying the relationship between sustainability and the built environment. Creating a sustainable built environment is partly a matter of practical innovations: making construction less resource-intensive, making buildings more efficient, limiting demolition, and facilitating reuse of existing structures. At the same time, sustainability has social and cultural dimensions. This course examines questions relating to all of these subjects in considering strategies for reducing emissions associated with building construction and operations.

The course is loosely organized in a three-part sequence. The first four weeks look at how buildings consume energy and approaches to improving operating efficiency, keeping existing buildings in use, and “green” building. Weeks five through ten expand the focus to engage questions about urban planning, transportation, and relationships between “urban” and “natural” environments. This portion of the course also investigates the concept of sustainability critically to bring its full implications into view, especially as relates to inequality. The final weeks consider practices, policies, and

technologies with the potential to reduce emissions associated with construction and building operations.

By the end of the course, students will understand why improvement in construction and building operations are crucial to reducing carbon emissions and creating a more equitable, more humane world. Knowledge gained through the course will help students make informed choices in their private and professional lives and engage thoughtfully in debates that will shape the future of communities throughout the United States and beyond.

### **Student Learning Outcomes**

By the end of this course, students will be able to:

1. Identify and explain the major approaches to reducing greenhouse emissions through design, construction, and operations, and the strengths and weaknesses of each.
2. Explain how towns and cities can become more sustainable through public policy, market-based incentives, and design strategies.
3. Explain why equity and inclusion are crucial components of sustainability.
4. Explain how smart growth strategies hold potential for creating more inclusive, more resilient, sustainable communities.
5. Explain the relationship between smart growth strategies and land and natural resource conservation.

### **Required Materials**

The following books are required for this course:

Bruce King et al. *The New Carbon Architecture: Building To Cool the Climate*. Gabriola Island, Canada: New Society Publishers, 2017.

Kent Portney. *Sustainability*. Cambridge, MA: MIT Press, 2015.

Marian Keeler and Prasad Vaidya. *Fundamentals of Integrated Design for Sustainable Building*. 2<sup>nd</sup> ed. Hoboken, N.J.: John Wiley and Sons, Inc., 2016.

All other assigned readings will be provided to students as PDF files via Canvas.

### **Course Assignments**

The graded assignments for this course consist of two in-class exams, a final exam, and three investigations that expand upon concepts examined in readings and lectures. These are described as follows:

**Exam 1.** In-class exam given during Week 4. The exam will consist of short answer and essay questions on readings, discussions, and lectures since the beginning of the semester. (Student Learning Outcomes 1 and 2)

**Exam 2.** In-class exam given during Week 9. The exam will consist of short answer and essay questions on readings, discussions, and lectures since Exam 1. (Student Learning Outcomes 3, 4, and 5)

**Final Exam.** The final exam will take place on the date and time reserved on the final exam schedule. Like exams 1 and 2, it will consist of short answer and essay questions. The final exam is *comprehensive*. You should prepare by studying all material covered during the semester. The content will be weighted toward material covered during the last six weeks of class. (Student Learning Outcomes 1-5)

**EPD Analysis.** Environmental Product Declarations (EPDs) present standardized information about the environmental impacts of products and services. EPDs are increasingly used by architects, engineers, and designers to make informed choices about materials. This assignment will familiarize you with EPDs and help you learn to select materials with low environmental impacts. (Student Learning Outcome 1)

**Social Justice Reflection.** Equity is a prerequisite for sustainable societies. In the contemporary world, equity is rare. This assignment requires you to consider an example of pronounced inequality and recommend a strategy for addressing them. You should outline your strategy in an essay of 8-10 pages, written for an audience who can be assumed to have sufficient power to enact at least some of your recommendations. We will discuss expectations in class. You will have at least three scenarios to choose from. (Student Learning Outcome 3)

**Policy Analysis.** This assignment requires you to examine a policy (proposed or actual) intended to advance sustainability at the municipal level. You will be asked to review and critique the policy and produce an analysis that identifies its strengths and weaknesses and outlines potential complications. Your analysis may take the form of a written paper or a graphic poster measuring 18 x 24". We will discuss expectations in class. No matter which format you choose, the strongest analyses will be thoughtful; draw upon assigned readings and class lectures; and incorporate additional research. You will have at least three scenarios to choose from. These will be provided by the instructor two weeks before the assignment is due. (Student Learning Outcomes 1, 2, and 4)

**Case Study.** This assignment asks you to apply knowledge gained throughout the semester to a problem involving a single building, a building complex, or neighborhood. You will have at least three cases from which to choose. Your investigation should assess the major problems present, propose solutions that incorporate sustainable practices, and justify your recommendations. You may submit your study as a written paper or a graphic poster measuring 18 x 24". We will discuss expectations in class. (Student Learning Outcomes 1-5)

NOTE: The case study has two due dates. A rough draft is due on November 11. Your draft will be returned with comments the following week. The final paper or poster is due when we meet on December 2.

### Course Grading

Final grades will be calculated as follows:

Exam 1	15
Exam 2	15
EPD Analysis	10
Policy Analysis	10
Social Justice Reflection	10
Case Study	15

Final Exam	15
Class Participation	10
Total:	100 points

Grading scale: 90 – 100% = A  
 80 – 89% = B  
 70 – 79% = C  
 60 – 69% = D  
 Below 60% = E

### **Excused Absences and Acceptable Excuses**

*Senate Rules 5.2.5.2.1* defines the following as acceptable reasons for excused absences: (a) significant illness, (b) death of a family member, (c) trips for members of student organizations sponsored by an educational unit, trips for University classes, and trips for participation in intercollegiate athletic events, (d) major religious holidays, (e) interviews for graduate/professional school or full-time employment post-graduation, and (f) other circumstances found to fit “reasonable cause for nonattendance” by the instructor of record. Students should notify the professor of absences prior to class when possible.

If a course syllabus requires specific interactions (e.g., with the instructor or other students), in situations where a student’s total EXCUSED absences exceed 1/5 (or 20%) of the required interactions for the course, the student shall have the right to request and receive a “W,” or the Instructor of Record may award an “I” for the course if the student declines a “W.” (*Senate Rules 5.2.5.2.3.1*)

### **Religious Observances**

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays. *Senate Rules 5.2.5.2.1(4)* requires faculty to include any notification requirements within the syllabus. If no requirement is specified, two weeks prior to the absence is reasonable and should not be given any later. Information regarding major religious holidays may be obtained through the Ombud’s website or calling 859-257-3737.

### **Verification of Absences**

Students may be asked to verify their absences in order for them to be considered excused. *Senate Rule 5.2.5.2.1* states that faculty have the right to request appropriate verification when students claim an excused absence due to: significant illness; death in the household, trips for classes, trips sponsored by an educational unit and trips for participation related to intercollegiate athletic events; and interviews for full-time job opportunities after graduation and interviews for graduate and professional school. (Appropriate notification of absences due to University-related trips is required prior to the absence when feasible and in no case more than one week after the absence.)

### **Make-Up Work**

Students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The instructor must give the student an opportunity to make up the work and/or the exams missed

due to the excused absence, and shall do so, if feasible, during the semester in which the absence occurred. The instructor shall provide the student with an opportunity to make up the graded work and may not simply calculate the student's grade on the basis of the other course requirements, unless the student agrees in writing. According to *SR 5.2.5.2.2*, if a student adds a class after the first day of classes and misses graded work, the instructor must provide the student with an opportunity to make up any graded work.

### **Excused Absences for Military Duties**

If a student is required to be absent for one-fifth or less of the required course interactions (e.g., class meetings) due to military duties, the following procedure (per *SR 5.2.5.2.3.2*) shall apply:

1. Once a student is aware of a call to duty, the student shall provide a copy of the military orders to the Director of the Veterans Resource Center. The student shall also provide the Director with a list of his/her courses and instructors.
2. The Director will verify the orders with the appropriate military authority, and on behalf of the military student, notify each Instructor of Record via Department Letterhead as to the known extent of the absence.
3. The Instructor of Record shall not penalize the student's absence in any way and shall provide accommodations and timeframes so that the student can make up missed assignments, quizzes, and tests in a mutually agreed upon manner.

### **Unexcused Absences**

If an attendance/interaction policy is not stated in the course syllabus or the policy does not include a penalty to the student, the instructor cannot penalize a student for any unexcused absences. (*SR 5.2.5.2.3.3*)

### **Prep Week and Reading Days**

Per *Senate Rules 5.2.5.6*, the last week of instruction of a regular semester is termed "Prep Week." This phrase also refers to the last three days of instruction of the summer session and winter intersession. The Prep Week rule applies to ALL courses taught in the fall semester, spring semester, and summer session, including those taught by distance learning or in a format that has been compressed into less than one semester or session. This rule does not apply to courses in professional programs in colleges that have University Senate approval to have their own calendar.

Make-up exams and quizzes are allowed during Prep Week. In cases of "Take Home" final examinations, students shall not be required to return the completed examination before the regularly scheduled examination period for that course. No written examinations, including final examinations, may be scheduled during the Prep Week. No quizzes may be given during Prep Week. No project/lab practicals/paper/presentation deadlines or oral/listening examinations may fall during the Prep Week unless it was scheduled in the syllabus AND the course has no final examination (or assignment that acts as a final examination) scheduled during finals week. (A course with a lab component may schedule the lab practical of the course during Prep Week if the lab portion does not also require a Final Examination during finals week.) Class participation and attendance grades are permitted during Prep Week. The *Senate Rules* permit continuing into Prep Week regularly assigned graded homework that was announced in the class syllabus.

For fall and spring semester, the Thursday and Friday of Prep Week are study days (i.e. "Reading Days"). There cannot be any required "interactions" on a Reading Day. "Interactions" include participation in an in-class or online discussion, attendance at a guest lecture, or uploading an assignment. See *Senate Rules 9.1* for a more complete description of required interactions.

### **Accommodations Due to Disability**

In accordance with federal law, if you have a documented disability that requires academic accommodations, please inform your instructor as soon as possible during scheduled office hours. In order to receive accommodations in a course, you must provide your instructor with a Letter of Accommodation from the Disability Resource Center (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754, via email ([drc@uky.edu](mailto:drc@uky.edu)) or visit their website ([uky.edu/DisabilityResourceCenter](http://uky.edu/DisabilityResourceCenter)). DRC accommodations are not retroactive and should therefore be established with the DRC as early in the semester as is feasible.

### **Non-Discrimination Statement and Title IX Information**

In accordance with federal law, UK is committed to providing a safe learning, living, and working environment for all members of the University community. The University maintains a comprehensive program which protects all members from discrimination, harassment, and sexual misconduct. For complete information about UK's prohibition on discrimination and harassment on aspects such as race, color, ethnic origin, national origin, creed, religion, political belief, sex, and sexual orientation, please see the electronic version of UK's Administrative Regulation 6:1 ("Policy on Discrimination and Harassment") (<https://www.uky.edu/regs/ar6-1>). In accordance with Title IX of the Education Amendments of 1972, the University prohibits discrimination and harassment on the basis of sex in academics, employment, and all of its programs and activities. Sexual misconduct is a form of sexual harassment in which one act is severe enough to create a hostile environment based on sex and is prohibited between members of the University community and shall not be tolerated. For more details, please see the electronic version of Administrative Regulations 6:2 ("Policy and Procedures for Addressing and Resolving Allegations of Sexual Assault, Stalking, Dating Violence, Domestic Violence, and Sexual Exploitation") (<https://www.uky.edu/regs/ar6-2>). Complaints regarding violations of University policies on discrimination, harassment, and sexual misconduct are handled by the Office of Institutional Equity and Equal Opportunity (Institutional Equity), which is located in 13 Main Building and can be reached by phone at (859) 257-8927. You can also visit Institutional Equity's website (<https://www.uky.edu/eo>).

Faculty members are obligated to forward any report made by a student related to discrimination, harassment, and sexual misconduct to the Office of Institutional Equity. Students can confidentially report alleged incidences through the Violence Intervention and Prevention Center (<https://www.uky.edu/vipcenter>), Counseling Center (<https://www.uky.edu/counselingcenter>), or University Health Service (<https://ukhealthcare.uky.edu/university-health-service/student-health>).

Reports of discrimination, harassment, or sexual misconduct may be made to Institutional Equity here.

### **Academic Integrity – Prohibition on Plagiarism (Senate Rules 6.3.1)**

Per University policy, students shall not plagiarize, cheat, or falsify or misuse academic records. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the

offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the University may be imposed. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty.

*Senate Rule 6.3.1* states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be, except under specific circumstances (e.g. Writing Center review, peer review) allowed by the Instructor of Record or that person's designee. Plagiarism may also include double submission, self-plagiarism, or unauthorized resubmission of one's own work, as defined by the instructor.

Students may discuss assignments among themselves or with an instructor or tutor, except where prohibited by the Instructor of Record (e.g. individual take-home exams). However, the actual work must be done by the student, and the student alone, unless collaboration is allowed by the Instructor of Record (e.g. group projects).

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain.

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

#### **Academic Integrity – Prohibition on Cheating (Senate Rules 6.3.2)**

Cheating is defined by its general usage. It includes, but is not limited to, the wrongfully giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. The fact that a student could not have benefited from an action is not by itself proof that the action does not constitute cheating. Any question of definition shall be referred to the University Appeals Board.

#### **Academic Integrity – Prohibition on Falsification/Misuse of Academic Records (SR 6.3.3)**

Maintaining the integrity, accuracy, and appropriate privacy of student academic records is an essential administrative function of the University and a basic protection of all students. Accordingly, the actual or attempted falsification, theft, misrepresentation or other alteration or misuse of any official academic record of the University, specifically including knowingly having unauthorized

access to such records or the unauthorized disclosure of information contained in such records, is a serious academic offense. As used in this context, "academic record" includes all paper and electronic versions of the partial or complete permanent academic record, all official and unofficial academic transcripts, application documents and admission credentials, and all academic record transaction documents. The minimum sanction for falsification, including the omission of information, or attempted falsification or other misuse of academic records as described in this section is suspension for one semester.

### **Diversity, Equity, and Inclusion**

The University of Kentucky is committed to our core values of diversity and inclusion, mutual respect and human dignity, and a sense of community ([Governing Regulations XIV](#)). We acknowledge and respect the seen and unseen diverse identities and experiences of all members of the university community. These identities include but are not limited to those based on race, ethnicity, gender identity and expressions, ideas and perspectives, religious and cultural beliefs, sexual orientation, national origin, age, ability, and socioeconomic status. We are committed to equity and justice and providing a learning and engaging community in which every member is engaged, heard, and valued.

We strive to rectify and change behavior that is inconsistent with our principles and commitment to creating a safe, equitable, and anti-racist environment. If students encounter such behavior in a course, they are encouraged to speak with the instructor of record or the [college's diversity officer](#), who is charged with addressing concerns about diversity, equity, and inclusiveness. Students may also contact a faculty member within the department, program director, the director of undergraduate or graduate studies, the department chair, or the dean. To submit an official report of bias, hatred, racism, or identity-based violence, visit the Bias Incident Support Services [website](#).

### **Course Schedule**

*Note: The instructor reserves the right to make changes when necessary to meet learning objectives, to compensate for missed classes, or for other reasons.*

#### **Week 1 Introduction and Course Overview**

Tues., Aug. 24.

Thurs., Aug. 26.

Read: (1) Architecture 2030, *Roadmap to Zero Emissions*; (2) AIA Climate Action Plan, 2020; (3) Brad Plumer and Henry Fountain, "A Hotter Future is Certain, According to U.N. Climate Report," *New York Times*, Aug. 9, 2021; (4) U.S. Environmental Protection Agency, "What Climate Change Means for Kentucky," 2016.

#### **Week 2 Toward Net Zero**

Tues., Aug. 31. How buildings produce carbon.

Read: (1) King et al., *New Carbon Architecture*, introduction and chaps. 1-2; (2) Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 1; (3) United Nations, *Sustainable Development Goals Report, 2021*.

Review online:



- (1) Architecture 2030 <https://architecture2030.org>  
 (2) Carbon Leadership Forum <https://carbonleadershipforum.org>

Thursday, Sept. 2.

Read: Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 8-10 and 14.

### Week 3

#### **Green Design**

Tues., Sept. 7. What is green design?

Read: (1) Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 2-4.

Thurs., Sept. 9. Rating systems and standards.

Read: (1) Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 18; (2) Brian Barth, "Is LEED Tough Enough for the Climate-Change Era?," [www.CityLab.com](http://www.CityLab.com), June 5, 2018; (3) Living Building Challenge version 4.0, June 2019.

Review online:

(1) LEED rating system overview <https://www.usgbc.org/leed>

**\*EPD analysis due**

### Week 4

#### **Greening Existing Buildings**

Tues., Sept. 14. Retrofitting for Energy Efficiency

Read: (1) King et al., *New Carbon Architecture*, chap. 3; (2) Paula Melton, "Six Ways Existing Buildings Can Save the Planet," [BuildingGreen.com](http://BuildingGreen.com), April 4, 2016 (on Canvas).

Thurs., Sept. 16. **First Exam**

### Week 5

#### **Green Cities, Green Communities**

Tues., Sept. 21. Sustainable Communities

Read: (1) Keeler and Vaidya, *Fundamentals of Integrated Design*, chaps. 16 and 17; (2) American Planning Association Policy Guide on Smart Growth, 2012.

Thurs., Sept. 23. Smart Growth in Practice

Read: (1) U.S. Environmental Protection Agency, *Creating Equitable, Healthy, and Sustainable Communities*, 2013 (on Canvas).

### Week 6

#### **Sustainability: Problems and Possibilities**

Tues., Sept. 28. Sustainability in Critical Perspective

Read: (1) Portney, *Sustainability* (entire).

Thurs., Sept. 30. Sustainability, Society, and Culture

Read: (1) World Happiness Report, 2020, chaps. 1 and 2; (2) Erle C. Ellis, "Science Alone Won't Save the Earth. People Have to Do That," *New York Times*, Aug. 11, 2018; (3) Benjamin Fong, "The Climate Crisis? It's Capitalism, Stupid," *New York Times*, Nov. 20, 2017.

**Week 7****Equity**

Tues., Oct. 5. Why Equity is Fundamental to Sustainability

Read: (1) Oxfam International, “Confronting Carbon Inequality, 2021; (2) Vann Newkirk, “The Victims of Climate Change are Already Here,” *The Atlantic*, Aug. 22, 2018.

Thurs., Oct. 7. Environmental Justice and Environmental Equity

Read: (1) “Principles of Environmental Justice,” 1991; (2) Cleveland Climate Action Plan 2018 Update.

**Week 8****Historic Preservation and Sustainability**

Tues., Oct. 12. No class. Please use this time to work on your social justice reflection.

Thursday, Oct. 14. Green Buildings from Old

Read: (1) Robert Young, “Historic Preservation and Adaptive Use: A Significant Opportunity for Sustainability,” *ARCC Conference Repository*, 2014; (2) National Trust for Historic Preservation, *The Greenest Building: Quantifying the Environmental Value of Building Reuse*, 2011

**\*Social justice reflection due**

**Week 9****Health**

Tues., Oct. 19. Indoor Environments and Human Health

Read: (1) Keeler and Vaidya, *Fundamentals of Integrated Design*, chaps. 5-7.

Thurs., Oct. 21. **Second exam.**

**Week 10****Green Policies**

Tues., Oct. 26. No class – fall break.

Thurs., Oct. 28. Greening Construction and Design

Read: (1) Denver Green Buildings Ordinance; (2) Denver Green Buildings Ordinance Handout; (3) Denver Green Buildings Ordinance Report, 2019.

**Week 11****The Lives of Buildings**

Tues., Nov. 2. Designing for Disassembly and Demolition

Read: (1) Hannah Wood, “Recycled Buildings: How to Design for Disassembly,” *Archinect*, June 6, 2018; (2) *Design for Disassembly: A Guide to Closed-Loop Design and Construction*.

Thurs., Nov. 4. Life Cycle Assessment

Read: (1) Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 19.

**\*Policy analysis due**

**Week 12****Materials**

Tues., Nov. 9. Wood, Straw, Concrete, and Plastics

Read: (1) King et al., *New Carbon Architecture*, chaps. 4-7; (2) Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 15.

Thurs., Nov. 11. Alternatives

Read: Selections from Alex Wilson et al., *GreenSpec Directory* (on Canvas).

Review online: Architecture 2030 Carbon Smart Materials Palette:

<https://materialspalette.org/palette/>

**\*Rough draft of case study due**

**Week 13**

**Waste and Materials Reuse**

Tues., Nov. 16.

Read: (1) Keeler and Vaidya, *Fundamentals of Integrated Design*, chap. 20; (2) Winston Choi-Schagrin, "Maine Will Make Companies Pay for Recycling," *New York Times*, July 21, 2021; (3) Austin, TX, Construction and Demolition Materials Ordinance.

Thurs., Nov. 18.

Read: (1) US Environmental Protection Agency, Best Practices for Reducing, Reusing, and Recycling Construction and Demolition Materials.

**Week 14**

Tues., Nov. 23. No class. Please use this time to work on your case study.

**Week 15**

**Nature in the Era of the Anthropocene**

Tues., Nov. 30.

Thurs., Dec. 2

**\*Final draft of case study due**

**Week 16**

**Looking Ahead: The Future of Green Design**

Tues., Dec. 7.

Read: (1) American Institute of Architects, *Renovate, Retrofit, Reuse: Uncovering the Hidden Value in America's Existing Building Stock*; (2) *Retrofit Chicago Commercial Buildings Initiative: Best Practices Report*, 2014.

**Final Exam**

Tues., Dec. 14, 10:30 am to 12:30 pm