Course Description

Environmentally sustainable practices and techniques are integral aspects of real estate development in a green economy. Today’s most compelling environmentally sustainable built environment schemes have in common their attitude of going “back to the basics” of physics, comfort, and climate to innovate beyond green certifications and other codes and regulations. The course focuses on exemplary contemporary buildings and urban developments worldwide that strive to be environmentally sustainable. In this course, each student will research, analyze, and document a case study of a building/urban development from a whole-system, concept-based perspective. The case studies will encompass multiple nested scales of analysis of the building, from occupant comfort to urban livability in passing by climatic context and the geography of sourcing of materials and talent. Students will also touch upon issues local regulatory context, including the sustainability rating system(s), and other incentives that influenced the owner’s, developer’s and design team’s vision. The work of the semester culminates in the production of a volume presenting these exemplary pieces of the contemporary built environment.

I. Rationale

Global warming is a huge challenge. It’s not an energy or resource depletion issue, it is a material crisis: our societies produce CO2 and other greenhouse gases (GG) far beyond what ecosystems can handle. Buildings consume a lot of resources and also produce a lot of GG’s as well as landfill-bound by-products. New, more-sustainably designed buildings can help. Similarly, and particularly in our already extensively built-up societies, outdated existing buildings must be retrofitted. Within the “Concentration in Development & Sustainability” of the Baker Program in Real Estate 2015-2016 catalogue, this course examines the environmental aspects of green building design.

Around the world, a growing number of genuine attempts are made to go beyond “business-as-usual” and to design comfortable, healthy, aesthetically pleasing, and easy to recycle buildings that also minimally adversely impact the environment. Soberingly, post-occupancy studies often show that a subset only of such attempts actually do deliver on their claims. Other, less appealing, essentially marketing-oriented approaches also exist; They rather cynically wrap business-as-usual buildings into sustainability claims by brandishing their “green features” that oftentimes are no more than added gadgetry following the all-to-common ethos of overconsumption. We call that a “product-based” approach to “sustainable design”. In contrast to such additive slant, the “concept-based” approach to sustainable design seeks to capitalize on
maximized synergies between different components of the whole building envisioned as a system. Among those who most convincingly challenge business-as-usual practices are design and development teams that, instead of trying to incrementally improve on existing flawed solutions/products, go “back-to-the-basics”, asking the question anew of what parameters make buildings environmentally successful.

Drawing from that inspiring approach, this introductory course is shaped by the conviction that students in the Real Estate and Architecture, Engineering & Construction (AE&C) should be equipped with basic notions of building physics, climate, human comfort, etc., in order to evaluate the environmental quality of buildings and the claims made about them. While it will not make you a specialist of any of these topics, possessing such introductory knowledge should help you in your professional interaction with all participants in the building delivery process, and particularly with asking better questions to and possibly challenging designers, engineers and consultants. As an added practical bonus, this knowledge should also help you buy a better dwelling.

The course offers the students an opportunity to become acquainted with a corpus of (mostly) successful built examples spanning the arc between the technologically heroic to the more humble low-tech from around the globe that all illustrate the “concept-based” sustainable design approach and its concomitant collaborative process.

II. Course Aims and Objectives:

Aims

CRP 3850-6593 SpTp Intro to Green Real Estate aims to prepare students to be thoughtful contributors to the multidisciplinary endeavor that is the design and development of green buildings/real estate.

The course aims to help the student begin to mentally map the field of sustainable architecture and its different subfields. It also ambitions to develop the students critical sense of what constitutes sustainability in architecture and real estate.

The course intends to impart foundational knowledge on passive solar design strategies in the student, as well as by looking at a corpus of noteworthy international buildings help the student begin to form the kernel of a culture about good, environmentally sustainable architecture and real estate.

The course highlights the current need for a strong vision and above average foresight and ethics on the part of the initiators (landlord, investor or/and developer) of truly sustainable projects, but also envisions the time when such higher-standards will have become the new baseline.

The course will encourage students to not only thinks about environmental and design factor that makes building comfortable but also to raise the sensory alertness to various thermal phenomena impacting the comfort.

The course aims to take advantage of its multi-disciplinary audience and potential for peer-to-peer learning.
Specific Learning Objectives:
At the end of this course the student should have an introductory understanding of:
- basic building physics and their potentially innovative impact on design;
- how to analyze a climate using a typical meteorological file;
- the impact of room orientation, and solar shading needs;
- human thermal comfort, the meaning of operative temperature and its impact on different ways of delivering thermal comfort;
- the difference between radiative, convective and conductive modes of heat transfer as they relate to building interaction with the environment and occupant comfort;
- the basic principles of how wind interacts with a building;
- the basic principles of wind- and stack-driven natural ventilation, and particular implementation strategies in demanding urban contexts;
- the difference between “concept-based” vs. “product-based” sustainable design approaches;
- the benefit a non-linear, collaborative design process in delivering high performance sustainable buildings /real estate;
- how the building he/she has analyzed works in terms of its environmental sustainability and +;
- the lessons learned from the corpus of international precedents analyzed in class as a whole;
- various green building ratings systems, their benefits and their limitations;

Some students will also improve their ability to correctly read architectural drawings.

III. Format and Procedures:
Learning in this course is supported primarily by lecture content and by the analysis work done by the students on the precedents’ studies. To keep the class engaging, the format will vary somewhat to include guest lectures, in-class labs including hands-on activities, and a on-campus site visit. Student participation in all activity is needed to ensure a lively learning community. The course is new, under constant development: its content, schedule and delivery method is subject to change without prior notice.

IV. My Assumptions
This course assumes that you, as an individual,
- are unsatisfied with the “business-as-usual” attitude in building design and real estate development, and would like to know about exemplary building that articulate a change in paradigm;
- are suspicious of the ambient “green-washing”, the marketing of which seems to only tell part of the story; have question about green building rating systems;
- are open-minded and wanting to be exposed to new ideas and facts, while being aware and suspicious of every one of us’ tendency to favor (or seek, or filter in) opinions that reinforce (without revising them) our prior preconceptions/explanations/theories;
- are of the opinion that climate, human thermal comfort, and basic building physics are subjects that are worth learning to be able to form a more complete picture of environmentally sustainable design;
- are convinced that you can learn from your peers, and are determined to commit your full involvement in the class, including participation in discussions and asking questions, in order to maximize the chances of learning for you and for your peers (who expect an equal commitment from you);
- will contribute, along with everyone else, to making the classroom a safe environment for anyone to raise any questions and voice any opinion.
V. Course Requirements:
- Continuous, predictable, regular, attendance as well as being awake and engaged are requested. Missing class is totally unwelcome because counterproductive. Other course (or studio) deadlines, other work overload situation, and travel/flight convenience issues are not ground for excused absences. Only doctor’s note—confirmed illness or death in the family—are ground for acceptable excuses. Repeated unexcused absences will have a negative impact on a student’s final grade.
- Course readings: there is no required textbook per se but a selection of readings will be posted on Blackboard for students to download or just handed out in class.
- The precedent analysis/case study assignment unfolds over the whole semester and should proceed gradually. You need to make your best effort at collecting information so that when you get in touch with the design team and development team, you are already quite knowledgeable and can target your question precisely. This will save valuable time for your interlocutors who will be grateful for it. This also will reflect positively on your degree program and the university at large. Who knows, these initial contacts could translate one day in internship or other employment opportunity. Be as professional as you can be in your interaction with these people who generously contribute to your/our education.
- Expected travel for course (and expected expenses not covered by Dept.): N/A. Only one class meeting to take place in the Nevin Welcome Center at Cornell’s botanical garden.

VI. Grading Procedures
Grades will be based on:
- Attendance and participation to labs 10%
- Homework (completing in-class labs) 5 %
- Precedent analysis (Lead author) 60%
- Detailed distribution to follow
- Precedent analysis (second author/reviewer) 20%
- Booklet 5 %

Undergraduate vs. graduate work will be reflected in the extend of the precedent analysis/case study.

VII. Academic Integrity (boiler pare)
Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. 

http://cuinfo.cornell.edu/Academic/AIC.html

Any work submitted by a student in this course for academic credit will be the student's own work, except in the cases of projects that are specifically structured as group endeavors. [Optional: For this course, collaboration is allowed in the following instances: list instances.]

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

VIII. Accommodations for students with disabilities
In compliance with the Cornell University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.
# IX. Tentative Course Schedule: *(Subject to change without prior notice)*

<table>
<thead>
<tr>
<th>#</th>
<th>Thu.</th>
<th>Topic(s), Lecture</th>
<th>In-class Lab</th>
<th>Due on that date…</th>
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<tbody>
<tr>
<td>1</td>
<td>01/28</td>
<td>Intro, Syllabus, Who PPC@ RPBW PPP Why Sustainability?</td>
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<td>2</td>
<td>02/04</td>
<td>Basics of Physics Review, Thermal Comfort Precedents Analysis (Show and Tell)</td>
<td>comfort.cbe.berkeley.edu Non-contact Thermometer (Tsurf, MRT)</td>
<td>Read Guy &amp; Farmer</td>
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<tr>
<td>3</td>
<td>02/11</td>
<td>Climate, Vernacular and Contemporary Architectural Examples (and open spaces) Example of free-floating room simulation</td>
<td>Weather Tool Climate Consultant …</td>
<td>Mapping comfort my room, guessing and measuring temperatures.</td>
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<tr>
<td>4</td>
<td>02/18</td>
<td>Climate Analysis Workshop Comparing different climate</td>
<td>Peer-to-peer, group</td>
<td>Climate Comparisons</td>
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<tr>
<td>5</td>
<td>02/25</td>
<td>Climate analysis presentations, Individual</td>
<td>My precedent climate analysis + brief, program, size (web search, publications)</td>
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<td>6</td>
<td>03/03</td>
<td>Systems I: Materials, Maintenance Cycles, Retrofit Health, off-gassing Investment: Build to use vs to sell</td>
<td>Read Alcott Categorize Materials in precedents re long-lasting Collect information on the project from Architect, Engineers, Developer</td>
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<td>7</td>
<td>03/10</td>
<td>Systems II: Guest Lecture: Timur DOGAN on Daylighting: Work plane, Room, Skins &amp; Controls, Building &amp; Urban Form</td>
<td>Read Addington or GZ Brown (TBA) Precedents plans, sections (&amp; one typ. space environmental concept section)</td>
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<td>8</td>
<td>03/17</td>
<td>Systems III: How air flows around buildings. Natural, Hybrid, Mechanical ventilation, HVAC vs. free cooling. Stack effect, Cross ventilation. <em>ROOM CHANGE:</em> meet at the Nevin Welcome Center, Cornell Plantations</td>
<td>Hand-held Anemometer, map interior airflows. Outdoor,</td>
<td>Read Aynsley, Linden,</td>
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<td>9</td>
<td>03/24</td>
<td>Building Analysis Presentation</td>
<td>Precedent analysis + presentation</td>
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<td>10</td>
<td>03/31</td>
<td>No Class/ Spring Break</td>
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<td>12</td>
<td>04/14</td>
<td>Guest Lecture: Gokhan CELIK on LCA &amp; more With feedback on Presentation Local Rating Systems Presentation relevant local Code aspects</td>
<td>Local rating systems Interviews/communication with architect, engineers, developer</td>
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<td>13</td>
<td>04/21</td>
<td>Final Booklet workshop.</td>
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<td>14</td>
<td>04/28</td>
<td>Final Presentation (Part I).</td>
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<td>15</td>
<td>05/05</td>
<td>Final Presentation (Part II) Wrap-up session: Sexy vs. Refrigerator</td>
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<td></td>
<td>05/12</td>
<td>Final presentation during exam period TBA</td>
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