Fall 2013 Course Syllabus

TOPICS IN SUSTAINABLE-BUILDING SCIENCE

[ARCH 597A, CIVL 598C, MECH 550B, RMES 500U]

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PREAMBLE

This course is the introductory course for students in the *Sustainable-Building Science Program,* and other interested graduate and undergraduate students. In view of the diverse backgrounds – natural sciences and engineering, health and social sciences, architecture, etc. – of the students who may register in this course, it is not reasonable to assume that a very deep understanding or quantitative analysis of all building science and sustainability areas can be covered. Rather, emphasis will be on providing a high-level conceptual/qualitative understanding of sustainability and the building design and construction processes and players, the integration and inter-dependency of the various building systems and their designs, the potential conflicts between them, and how this understanding informs design decisions to create buildings with a higher level of performance, including a high level of sustainability.

COURSE OVERVIEW

This course will be offered at the graduate level, open to students in the natural sciences and engineering, health and social sciences, architecture, etc. interested in learning how to create better, more sustainable buildings. It will normally be a required course for graduate-student trainees in the *Sustainable Building Science Program*, and an elective for other graduate students. Motivated students in their final year of an undergraduate program with strong academic records may be permitted to take the course as an elective.

The knowledge required to understand the objectives and processes of sustainable building, how inhabitants interact with buildings, how quality is defined and evaluated, and of building systems, will be delivered through a variety of means: lectures from specialists, assigned readings, comparative case studies, and site visits. The students will develop a qualitative understanding of the topics below at the depth necessary to understand key issues and identify relationships, with a focus on sustainable building.

COURSE LEARNING OBJECTIVES

1. To gain a basic understanding of the natural, health and social science and engineering issues associated with the design, construction and operation of (sustainable) buildings – that is, of (sustainable-) building science.
2. To understand the relationship between building inhabitants and building systems.
3. To understand the (sustainable-) building design and construction processes and stakeholders.
4. To become familiar with building drawings, and apply this knowledge to the analysis, critique and comparison of two contrasting UBC buildings through their drawings.
5. To understand issues of sustainability and the contribution of buildings, and be able to analyze a building's performance according to a number of sustainability indicators, recognizing their dependence on one another.

6. To understand the various systems that all building must contain in order to function successfully, to identify the respective professionals responsible for the design of each, and to be able to identify the inter-relationships and dependencies among these various systems.
7. To understand the importance of establishing building performance criteria for each of the building systems at the design stage, and how to evaluate performance through the analysis of post-occupancy performance data.
8. To understand the importance of approaching building design using an integrated design process (IDP) involving all design consultants, in order to attain high levels of performance through the appropriate integration of all building systems.
9. To apply the knowledge learned to real-world buildings.

COURSE FORMAT / EVALUATION

The students will meet twice weekly for 1½-2 hour lectures. These will be supplemented by a number of 1½-2 hour discussion sessions and student presentations.

Discussions will be based on applying the knowledge gained in the lectures, from drawings and site visits, to two UBC case-study buildings: the Centre for Interactive Research on Sustainability (CIRS) and the Aquatic Ecosystems Research Laboratory (AERL).

Students will be evaluated on the basis of essay responses to five assignments which analyzing, critiquing and comparing the two buildings with respect to topic of the previous weeks' lectures. 10% of the course will be for participation.