ENV 335H ENVIRONMENTAL DESIGN ~ 2017 Course Outline ~ School of Environment, U of T

Course Instructor: Sheila Waite-Chuah, BA, AOCA, MES
Office: Room ES 2104
Office Hours: 2-3 pm ~ by appointment ~ Instructor is only on campus for this one course.
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Hours of Instruction: Wednesdays 12-2, Earth Sciences Buildings B149; Office (ES) 2104, 2-3 pm, *by appt*.

I. Introduction

Sustainable design is defined as 'a philosophical approach to design that seeks to maximize the quality of the built environment while minimizing or eliminating negative impacts to the environment.' The main theme of the course is to address the massive migration of human populations to urban centres, with the resulting impacts to environmental and human health; buildings are often overlooked as significant contributors to greenhouse gasses and global warming. What are the functions of architecture? How many hours will you spend in a building today, this year?

Through leading-edge case studies, this course will critically examine concepts, theories and practices across multiple scales of sustainable design, including architecture, engineering, product design, landscape architecture and urban design. We will explore the beginnings of sustainable design in biological, indigenous/vernacular, industrial, and modern cultures.

'Low-tech' and 'high-tech' strategies for achieving occupant comfort will be examined, with many references to traditional practices – natural ventilation and thermal mass, for example. Excellence in architectural design will be explored through case studies from around the world; a class tour to the Brickworks (tbc) will present a showcase of ecological strategies integrating natural and built systems.

Course Learning Objectives

- **to introduce students to a range of principles and practices in sustainable design**
- **to understand the built environment as a major contributor to environmental degradation**
- **to promote an understanding of sustainable design as at the *interface* of many systems: cultural, economic, political, natural**
- **to highlight the *interdisciplinary nature* of sustainable design through exploring engineering, architecture, product design, landscape architecture, and urban design**
- **to cultivate sustainable design literacy**
- **to provide students with an opportunity to link research with practice**
- **to provide students with an opportunity for a solutions-based approach to environmental issues**

Class Format

This course meets once per week. The majority of class time will be spent with PowerPoint lectures and class discussion. The annual class tour to Evergreen Brickworks is on March 30th.

- regular attendance and on-time arrival (12:10 – to allow travel between classes)
- cell-phones off in class; laptops for note-taking permissible, for material not on PowerPoint
- active and meaningful participation in class discussion and presentations
- on-time submission of assignments – HARD COPY and DIGITAL submission
- Two mandatory workshops – for design projects.

II. Required Reading

Course material is presented in PowerPoint lectures available on Blackboard course files; material is derived from current texts on sustainable design (see Bibliography below).
Note: there are no extra readings – texts are as reference only.

III. Assignments

See Blackboard, 'Course Materials'. All assignments will be reviewed in detail in mandatory Workshops (see schedule).

- 3 Quizzes ~ multiple-choice, short-answer (@15% = 45%)
- 'Retrofit Home 2016' assignment ~ HARD COPY submission (25%)
- Sustainable Design Awards ~ digital poster assignment (30%)
  Note: Students are encouraged to work in teams of two for Awards assignment.

Submitting Assignments

Please read the assignment documents for detailed instructions regarding submission format.
'Dream Home' assignment must be submitted in Hard Copy and also on Blackboard;
'Sustainable Design Awards' – will be presented in class by lottery; Hard Copy of Summary must be submitted in class; digital poster must be submitted on Blackboard.
NOTE: Marks will be deducted if Hard Copy is not submitted in class.

Late Assignments

Deducted at 2% per day, including weekends, for a maximum of 5 days.
NOTE: Late Hard Copies must be submitted to administration office for instructor pick up.
EXTENSION: If you need an extension for illness or accessibility, see below for information ~ **Medical Certificate & Documentation Supporting Extensions** (p4).

Bibliography

ASHRAE – American Society for Heating, Refrigeration & Air-Conditioning Engineers

Ackerman ME. **Cool Comfort: America's Romance with Air-Conditioning**. Washington, DC: Smithsonian Institute Press, 2002.

Benyus J. **A Good Place to Settle: Biomimicry, Biophilia and the Return of Nature's Inspiration to Architecture.** Chapter 3. [From Kellert, 2008]

Jodidio, Philip, **GREEN Architecture Now!** Taschen, 2009.
- Case studies, from a global context

Horowitz, B.A., Assoc. Ed. From Fregly, J. and Clark Blatteis. Eds. Handbook of Physiology; Section 4: Environmental Physiology. Vol I. New York. Oxford Press, 1996.
- Section II: The Thermal Environment. Part 3. Adaptive Responses to Cold.

Kellert, Stephen, Heerwagen, J., Mador, M. **Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life.** John Wiley and Sons Inc., New Jersey, 2008.
- Main reference, 'biophilic design'

Lechner, Norbert. **Heating, Cooling, Lighting: Sustainable Design Methods for Architects**. Third Ed. John Wiley & Sons, Inc., New Jersey, 2009.
- General reference, 'Low-Tech', passive strategies

Macaulay, David, and McLennan, Jason. **The Ecological Engineer.**
Volume 1: KEEN Engineering. ECOtone, 2006.
- 'Low-Tech' & 'High-Tech' strategies in ecological engineering

McDonough, William, and Braungart, Michael. **Cradle-to-Cradle: Remaking the Way We Make Things.** North Point Press, 2002.
- Lecture on product design, i.e., consumer products

McLennan, Jason. **The Philosophy of Sustainable Design: The Future of Architecture.** ECOtone, 2004.
- Principles of ecological engineering

Papanek, Victor. **The Green Imperative: Natural Design for the Real World**.

Thames and Hudson, NY, 1995.
- 'Six Fallacies of Vernacular Architecture', 'Six Explanations'

Parsons, K.C. **Human Thermal Environments.** NY, Taylor & Francis, 2002
- The effects of hot, moderate and cold environments on human health and comfort and performance.

Ponting, Clive. **A New Green History of the World: The Environment and the Collapse of Great Civilizations.** Penguin, 2007.
- 'Cautionary Tales' of Sumerian, Easter Island cultures

Redclift, M. **Wasted: Counting the Costs of Global Consumption**.' Earthscan 1996.

Senay, L.C. from Fregly, J. and Clark Blatteis. Eds. Handbook of Physiology; Section 4: Environmental Physiology. Vol I. New York. Oxford Press, 1996.
- Section II: The Thermal Environment. Part 2, Adaptive Responses to Heat.

Shove E. Comfort, **Cleanliness, Convenience: The Social Organization of Normalcy**. Berg, Oxford, New York, 2003.

Van der Ryn, Sim, and Stuart Cowan. **Ecological Design.** Island Press, 1996.
- Principles addressing the integration of built and living systems

Whitmore J, and Schulze P. 'Artificial Light in the Work Environment: A Balanced Perspective for Energy Efficiency and Support for Immunological Health.' International Journal of Environmental, Cultural, Economic and Social Sustainability. School of Family and Consumer Sciences, University of Akron, Ohio. Volume 7, Issue 3, pp 171-178. http://ijs.cgpublisher.com/product/pub.41/prod.826

Technical Material

Canadian Centre for Housing Technology (CCHT), http://www.ccht-cctr.gc.ca/eng/index.html

National Resources Canada, Housing. Energy Star for New Homes, www.nrcan.gc.ca/residential/new-homes/6531
- Energuide for Houses, Net Zero Emission Homes, http://canmetenergy.nrcan.gc.ca/buildings-communities/housing/685

Passive House Institute US (PHIUS) www.passivehouse.us

ENV 335H ~ Environmental Design ~ 2017 Weekly Schedule ~ U of T

Sheila Waite-Chuah, BA, AOCA, MES sheila.waite.chuah@utoronto.ca Office: ES 2104, 2-3 pm, by appointment

Week 1 **Introduction:** course content, weekly schedule, assignments.
January 11 Note: Class material is presented in PowerPoint format and is accessed on Blackboard; there are no extra readings – *texts are as reference only.*

The Evolution of Sustainable Design ~ Part I (PPT)
Ref: The Philosophy of Sustainable Design, Jason McLennan, 2004.
Biological & Indigenous/Vernacular Beginnings

Week 2 **The Evolution of Sustainable Design ~ Part II** (PPT)
January 18 *Ref: The Philosophy of Sustainable Design*, Jason McLennan, 2004.
Industrial & Modernist Beginnings

Week 3 **Low-Tech Solutions ~ Part I** (PPT)
January 25 Principles of thermal comfort; historical and contemporary strategies for Passive Cooling: natural ventilation, thermal mass, façade integration.
Ref: Macaulay & McLennan, 2006; Lechner 2009

Homework: Quiz # 1 - next class

Week 4 **Low-Tech Solutions ~ Part II** (PPT)
February 1 Passive Cooling: shading; Passive Solar Heating; Daylighting.
Ref: Macaulay & McLennan, 2006; Lechner, 2009, AASHRAE

Quiz # 1 ~ 15% ~ Evolution Part I & II; Low-Tech Part I (Weeks 1, 2, 3)

Week 5 **'10 Shades of Green' ~ Architecture** (PPT)
February 8 Principles & Case Studies, from the Architectural League of America.
Ref: http://www.tenshadesofgreen.org/middle_main.html

Homework: Quiz # 2 - next class

Workshop ~ Dream Home (Due: Week 9, March 15th)
Review: Content, format for paper (text & images), evaluation criteria, submitting.

NOTE: **Attendance is mandatory;** student samples will be shown as inspiration.

Week 6 **High-Tech Solutions** (PPT)
February 15 High-technology solutions, focusing on water, air, heating & cooling.
Ref: Macaulay & McLennan, 2006

Quiz # 2 ~ 15% ~ Low-Tech Part II; 10 Shades of Green (Weeks 4 & 5)

February 20th - 24th ~ Reading Week - No Classes

Week 7 **'Waste Equals Food' ~ Sustainable Product Design** (PPT)
March 1 Cradle-to-Cradle: Remaking the Way We Make Things.
Ref: McDonough & Braungart, 2002

Homework: Quiz # 3 - next class

Week 8 **Ecological Design** (PPT)
March 8 Principles for the integration of built and living systems.
Ref: Sim Van der Ryn and Stuart Cowan, 1996.

Quiz # 3 ~ 15% ~ High-Tech; Waste=Food (Weeks 6 & 7)

Homework: Dream Home – due next class

Week 9 **Assignment Due: Dream Home (25%)**
March 15 Submissions: 1. Hard Copy in class*, double-sided, stapled;
2. Blackboard, Last name/ first name.
**Marks deducted without Hard Copy submission in class*

Workshop ~ Sustainable Design Awards (Due Week 12, April 5th)
Review: Content, digital poster format (text & images), evaluation criteria, submitting;graphic design tips for digital poster.

Note: Attendance is mandatory; student samples will be shown.
Note: Students are encouraged to work in teams of two for this assignment.

Week 10 **Bioregional Design** (PPT)
March 22 'One Planet Living', *Ref:* http://www.opl.org/index.htmll;
Case Study: Bed ZED Housing UK*:*
http://www.oneplanetcommunities.org/BedZED//

Week 11 **TOUR: Annual Tour ~** Evergreen Brickworks ~ Local Case Study
March 29 'People / Planet / Prosperity'

Homework: 'Sustainable Design Awards' – due next class / last class

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Week 12 **Assignment Due: 'Sustainable Design Awards' (30%)**
April 5 Submissions: 1. Student Presentations in class ~ by lottery
2. Blackboard, Last name / first name
(Individual = Doe, Jane; Teams - Alphabetical = Deer & Doe)

The following information is included on behalf of the School for Environment. Read carefully.

A. Plagiarism

Please note that according to the University's Code of Behaviour on Academic Matters, it is an offence for a student to:

1. "represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e., to commit plagiarism."
2. "submit, without the knowledge and approval of the instructor to whom it is submitted, any academic work for which credit has previously been obtained or is being sought in another course or program of study in the University or elsewhere.
3. "submit for credit any academic work containing a purported statement of fact or reference to a source which has been concocted."

See "Code of Behaviour on Academic Matters" on the U. of T. Governing Council website at this address:
http://www.governingcouncil.utoronto.ca/policies/behaveac.htm

See also the handout "How Not to Plagiarize," Margaret Proctor, 2009, available online at
http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize

Cases of suspected plagiarism will be addressed in accordance with the procedure established by the Code of Behaviour on Academic Matters.

B. Accessibility Services

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***Accessibility Needs**:*

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: disability.services@utoronto.ca or http://studentlife.utoronto.ca/accessibility .

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Medical Certificate & Documentation Supporting Extensions, etc.

Students must use the University's official Student Medical Certificate as the standard documentation requirement for medical-based extension requests. A copy can be found on the web at http://www.healthservice.utoronto.ca/ for inclusion in your course website or reader.

Students must use a medical certificate and/or provide other documented proof, where feasible, if they request an extension for assignments, term test during class time, etc. This documentation must be kept secure and confidential under provincial privacy legislation.

A student who is registered with Accessibility Services, or otherwise provides appropriate documentation to their college registrar, may receive a Registrar's Letter attesting to his/her legitimate need for an extension or other consideration, which you should accept in lieu of the student providing you with the supporting documentation directly. This protects the student's personal information, makes it easier for him/her to request and get appropriate consideration, and relieves you of having to secure private information about the student that is contained in supporting documentation.

Faculty of Arts & Science Policies
Information about important policies about marking, petitions, etc., can be found on the Faculty of Arts and Science website at: http://www.artsandscience.utoronto.ca/ofr/calendar/rules.htm#behaviour

Evaluation Criteria ~ A standard evaluation criteria policy, which is included for your interest.
The **primary criteria used in evaluating written work** are the following.

1) Mechanics: Defined as freedom from spelling and grammatical errors. Students are expected to include thorough, accurate and consistent references in any *bona fide* academic referencing style that includes page numbering.

2) Writing style: Defined as clarity, succinctness, appropriate diction and tone.

3) Structure: Defined as coherence of the organization of the paper. The logic of the structure is determined by the purpose, which is to test an hypothesis, answer a research question or defend a thesis statement.

4) Precision and accuracy. Precision means saying exactly and specifically what you mean, avoiding vague generalities. Accuracy refers to absence of major factual errors.

5) Analysis: Student essays are expected to include critical distance, reflection and originality of thought. The proposal and term paper will be evaluated on the defensibility of their analysis in terms of their use of evidence and logical coherence.

EVALUATING ~ Evaluating Student Work

Students will be evaluated on the course requirements according to the information in the assignment document. Students will be provided with evaluation criteria for each assignment. Overall grades will be assessed in accordance with the University's description as provided in the Academic Handbook as discussed below.

Letter Grade	**Grade Definition**
A+	**Outstanding performance**, exceeding even the A described below.

A	**Exceptional performance**: strong evidence of **original thinking;** good organization, capacity to analyze and synthesize; superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base.
B	**Good performance**: evidence of grasp of subject matter; some evidence of critical capacity and analytic ability; **reasonable** understanding of relevant issues; evidence of familiarity with the literature.
C	**Intellectually adequate performance**: student who is profiting from her or his university experience; understanding of the subject matter and ability to develop solutions to simple problems in the material.
D	**Minimally acceptable performance**: some evidence of familiarity with subject matter and some evidence that critical and analytic skills have been developed.
F	**Inadequate performance**: little evidence of even superficial understanding of the subject matter; weakness in critical and analytic skills; with limited or irrelevant use of literature.