IDES 3107 Design and Sustainability  Winter 2019  COURSE OUTLINE

Instructor  Kevin Brady B. SC, M.E.S.
email: Kevin.Brady@Carleton.ca or brady@sustainableenterpriseconsulting.com

Course time and location  Wednesdays 8:35am – 11:25am  2104 Canal Building
Office hours  After scheduled class or by appointment
Office  446 Azrieli Pavilion (AP)

Course Description
Sustainability and the industrial designer’s role in creating more environmentally and socially responsible products. Imperatives and drivers for integrating sustainability into product design. Sustainable design strategies and tools, business case for sustainable design, and case studies.

Learning Outcomes
By the end of this course students will be able to;

1. Articulate the importance of sustainability for product design, the role of sustainability in product development and the principles of sustainable design.

2. Understand how to apply life cycle strategies and circular economy concepts to understand the potential impacts of a current product or concept.

3. Discern a viable eco-design strategy for a product and justify how it contributes to sustainability.

4. Understand social impacts of product systems and emerging techniques to measure them.

5. Apply concepts and techniques of eco design to real life projects

Course Schedule
Course schedule is provided in Appendix 1.

Guests Lectures. 2-3 guest lectures are planned.

Recommended Reading and Resources


Mining and metals and the circular economy. Available on course site. International Council on Mining and Metals 2016 (Kevin Brady author)


Green building design and products for sustainable construction. http://www.greenspec.co.uk/


Centre for Sustainable Design at University for the Creative Arts (UCA), Farham, UK. http://cfsd.org.uk/ - Excellent set of resources on sustainable design practices, research, case studies and project outcomes.


**Required Text**

There is no required reading. Articles/readings will be recommended throughout the course.

**Course Projects/Assignments/Exams**

**Assignment 1** (40% of course mark)
Research and write an analysis of a product that is marketed as being environmentally or socially responsible/preferred. Address the following:

1. Describe the product, its primary function and main life cycle stages (20 marks)
2. Document the “sustainability” benefits of the product being promoted by the manufacturer (10)
3. Research and document the main environmental and social impacts associated with the product life cycle (30)
4. Compare 2 and 3 – do the benefits claimed adequately reflect the main issues identified in your research (30)
5. Speculate on the role of design in addressing any gaps or making additional improvements in the sustainability performance of the product (10)

**Assignment 2 (35% of course mark)**
Students will be assigned in groups to an “advanced concepts” cross functional product development team. Students in each group will agree on their individual role (e.g. supplier management, material selection, product development, marketing, production and sustainability). Each team will develop a product brief (this can be informed by assignment 1). The brief will include information on the current generation product – bill of materials, key functions, supplier information etc. Working in groups of 5 to 6 during class time, and outside of class as needed, the teams will come up with a set of recommendations for improving the sustainability of the **product system**. Each individual on the team will also be responsible for submitting a one page description of their area of responsibility and how it can/did influence sustainability of the product. Results will be presented in the last two class sessions.

**2 Quizzes (total of 20 % of course mark)**
Individual, marked in class by your peers and handed in. These simple quizzes will help confirm your understanding of the concepts as we progress through the course.

**Summary of Course Evaluation Information**
- 40% Assignment 1
- 35% Assignment 2
- 20% Quizzes
- 5% Participation and Professionalism

**Course Completion Requirements**
Deliverables required to pass the course:
- Assignment 1
- Assignment 2 Group presentation and individual report

**Individual/Group Work**
Courses may include various combinations of individual and group work. Students must demonstrate individual aptitude. It is important where collaborative work is undertaken that students be able to clearly demonstrate that individual contribution has been made. Where the evaluation for individual work is below a passing grade, that grade will be awarded for the course.

**Course Deliverables for reviews and other due dates**
All deliverables submitted late will accrue a 10% per day deduction from the determined grade, to a maximum of 3 days, from the original deadline time and date. Failure to submit within 3 days, without approval from the instructor, will result in a grade of F.
**Participation and Professionalism**
Active participation and professional conduct are particularly important in studio courses and will be evaluated. At the same time, when the student’s work is reviewed at the end of the course, an evaluation will be made based on one or more of the following: in class discussion; consultations with instructors; and work ethic. However, none of these evaluations will be used to raise an overall failing grade, to a passing one, based on the quality of the work.

**Student Access to Exam Papers**
Examinations are for evaluation purposes only and will not be returned to the student.

**Requests for Academic Accommodation**
You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

**Pregnancy obligation**
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: https://carleton.ca/equity/accommodation/

**Religious obligation**
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: https://carleton.ca/equity/accommodation/

**Academic Accommodations for Students with Disabilities**
If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

**Survivors of Sexual Violence**
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

**Accommodation for Student Activities**
Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic
accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline

In industrial design, ideas and concepts come from a multitude of sources to be modified and utilized in the design and development process. The student should reference sources appropriately.

- **Student Responsibility (lecture courses)**
  The student is responsible for knowing the content of this course outline, the schedule of classes, assignments, and examinations; and material covered during any absence from scheduled classes. [OR]

- **Student Responsibility (studio courses)**
  The student is responsible for knowing the content of this course outline, the schedule of classes, assignments, and reviews; and material covered during any absence from scheduled classes.

**Changes to the Course Outline**
The course outline may be subject to change in the event of extenuating circumstances.
## Appendix A – Course Schedule

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Learning Focus</th>
<th>Evaluation</th>
<th>Lecture</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 9</td>
<td>Sustainable Development -societal and corporate context</td>
<td></td>
<td>Course Outline Introduction to sustainable development and the circular economy Introduction to corporate sustainability</td>
<td>The World in 2050</td>
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<tr>
<td>2</td>
<td>Jan 16</td>
<td>Sustainable products – overview impacts and benefits</td>
<td>Assignment 1 Introduced Choose topics</td>
<td>Product System Hot spots and impacts Sustainable Product Strategy</td>
<td>What is a Sustainable Product</td>
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<td>3</td>
<td>Jan 23</td>
<td>Sustainable design concepts and tools (1)</td>
<td>Life cycle assessment, life cycle management, cradle to cradle 4Rs</td>
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<td>Life Cycle Mapping</td>
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<td>4</td>
<td>Jan 30</td>
<td>Sustainable design concepts and tools (2)</td>
<td>Eco- efficiency/effectiveness Total Cost of Ownership, Environmental Management Systems,</td>
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<td>5</td>
<td>Feb 6</td>
<td>Sustainable and eco-design strategies</td>
<td>Quiz 1</td>
<td>Eco-Design Wheel Social responsibility considerations</td>
<td>Exploring Scenarios</td>
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<td>6</td>
<td>Feb 13</td>
<td>Standards and guidelines</td>
<td>Assignment 1 Due Assignment 2 introduced – Choose Topics</td>
<td>Design standards, manuals and guides</td>
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<td>7</td>
<td>Feb 27</td>
<td>Design for Sustainability tools</td>
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<td>Sustainable design tools and software</td>
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<td>8</td>
<td>Mar 6</td>
<td>Materials and sustainability</td>
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<td>Sustainability Attributes of Materials Responsible sourcing priority risks</td>
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<td>9</td>
<td>Mar 13</td>
<td>Packaging</td>
<td>Quiz 2</td>
<td>Sustainable Packaging Coalition Guidelines Packing Redesign Exercise</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Details</td>
<td>Groups</td>
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<td>10</td>
<td>Mar 20</td>
<td>Special topics</td>
<td>Trade-offs</td>
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<td>Social Life Cycle Assessment</td>
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<td>11</td>
<td>Mar 27</td>
<td>Assignment 2 presentations</td>
<td>Assignment 2 Due-</td>
<td>Groups</td>
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<td>first set of presentations</td>
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<td>12</td>
<td>April 3</td>
<td>Assignment 2 presentations (Cont’d)</td>
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<td>Groups</td>
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<td>second set of presentations</td>
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<td>Reflections on sustainability and design</td>
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