Learning Outcomes: This course is designed to introduce students to the concepts of selection, comparison between and construction with green building materials. The intent of the course is not to introduce specific materials but rather to develop the critical reasoning skills necessary for the evaluation of what truly makes a material “green”. Specific concepts will focus on long-term performance (e.g. durability) of materials and what can limit a material’s inherent durability (e.g. its in-place environment). Material production in terms of raw materials as well as processes will also be introduced as these are essential to ensuring the “green” factor of a material. While this course is not geared specifically toward green building programs such as LEED, concepts from such programs will be introduced. It is envisioned that upon completion of the course, students could take a short seminar (already offered at OSU) to prepare them to take the new LEED exam for the new LEED Green Associate status.

Through interactive group work, discussions and homework assignments, students will learn to select materials for and design various components of green building materials and systems and to evaluate the building performance according to relevant standards. Concepts of life-cycle analysis, including performance and economics will also be introduced. This course will encourage students to go beyond a traditional design approach where they will consider choosing building materials based on their initial conception, through production, transport, placement and construction followed by going further into long-term use, re-use and recycling.
The course is designed for upper division undergraduate and graduate students in Civil and Construction Engineering. However, students from other disciplines of engineering, architecture and the natural sciences are encouraged to take the course as they can benefit from discussions, assignments and activities of this class.

**CCE 422 Learning Outcomes:** At the end of the course **undergraduate** students should be able to:

1. Define sustainability in their own words and relate how material selection in new construction will define long-term sustainability of the built element(s).
2. Identify criteria essential to determining what makes a building material truly “green”.
3. Demonstrate concepts of life-cycle analysis including economic and sustainability aspects and apply these concepts to green building materials.
4. Extend their knowledge of design (e.g. typically for forces acting on structures) to the interaction with the environment in which that material is put into place.
5. Evaluate a given material to determine what makes it a green building material and if it will meet or exceed the performance of the material(s) it will potentially replace.
6. Demonstrate improved technical writing and presentation skills through individual and group assignments.

**CCE 522 Learning Outcomes:** At the end of the course **graduate** students should be able to:

1. Formulate criteria essential to determining what makes a building material truly “green”.
2. Use a pre-defined set of criteria (Outcome 1) to compare different green building materials and to evaluate a given material to determine what makes it a green building material and if it will meet or exceed the performance of the material(s) it will potentially replace.
3. Predict the potential long-term benefits or challenges for a given green building material using concepts of life-cycle analysis including economic and sustainability aspects.
4. Combine their knowledge of design (e.g. for forces acting on structures) with environmental impacts on the interaction with the environment in which that material is put into place.
5. Demonstrate improved technical writing and presentation skills through individual and group assignments as well as a final group presentation.

**Recommended Prerequisites:**

Highly Recommended: CCE 321 (or equivalent)

Unenforced prerequisites: ST 314 or equivalent and Econ 201 or Econ 202 or equivalent

Instructor approval for students outside CCE
Course Materials:  

Recommended Resources:


Technical Writing


-or-


Additional Materials on library reserve and other resources may be borrowed from the instructor or posted to Blackboard

CCE 422 Grading:  

Homework Assignments  25%  
Mid-Term Exam  25%  
Term Project Report  15%  
Term Project Presentation  10%  
Course Portfolio*  15%  
Class Participation  10%  

*must contain final report copy  

CCE 522 Grading:  

Homework Assignments  15%  
Technical Reviews (2)  15%  
Mid-Term Exam  25%  
Term Project Report  15%  
Term Project Presentation  10%  
Course Portfolio*  10%  
Class Participation  10%  

*must contain final report copy
Schedule (Tentative):

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<th>Date</th>
<th>Lecture</th>
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<td>Course Overview, Sustainability &amp; Green, Course Portfolio</td>
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<td>January 10</td>
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<td>Life Cycle Analysis</td>
<td>BEES</td>
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<td>January 15</td>
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<td>Life Cycle Analysis</td>
<td>BEES</td>
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<td>January 17</td>
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<td>Athena Eco Calculator - In Class</td>
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<td>January 22</td>
<td>5</td>
<td>Guest Lecture - Ms. Erin Moore - End of Life Materials Consideration</td>
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<td>January 24</td>
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<td>Guest Lecture - Dr. Ari Sinha - Wood-Based Materials</td>
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<td>January 29</td>
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<td>Green Building Products - Philosophies</td>
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<td>January 31</td>
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<td>Raw Materials Acquisition/Regional Materials</td>
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<td>Carbon Footprinting</td>
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<td>Energy Considerations</td>
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<td>March 5</td>
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<td>Other Sustainability Programs</td>
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<td>March 7</td>
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<td>TBD</td>
<td>TBD</td>
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<td>March 12</td>
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<td>Course Wrap-up</td>
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<td>March 14</td>
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<td>Final Presentations - In Class, Course Portfolio Due</td>
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Assignments: Are due by 5:00 pm on the due date assigned by the instructor. These may be turned in to Dr. Ideker’s mailbox in Owen 220. Absolutely, NO late assignments will be accepted unless PRIOR arrangement has been made with the instructor.

Examinations: There will be one mid-term examination and a term project (report and presentation). The examination will be closed notes and closed book. Missed examinations may only be made-up in extenuating circumstances (documented personal illness or family emergency). Every effort should be made to notify the instructor prior to the examination if the student is unable to take the examination at the regularly scheduled period.

Class Attendance: Attendance is mandatory. You are expected to attend every class and participate. If you are unable to attend, notify the instructor before that class. If you do miss class, it is your responsibility to find out from another student what was covered and any administrative information presented. Excessive class absence will lower your class participation grade.

Students with Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the
course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

DAS e-mail address is: Disability.Services@oregonstate.edu and their website is: http://ds.oregonstate.edu/home/

**Student Conduct:** It is expected that you know and will abide by the CCE Honor Code posted at: http://cce.oregonstate.edu/students/undergrad/honorcode.html

Two other documents are posted at the website above: CCE as a Professional Community and the Student Code of Conduct. You are also expected to know and abide by these conducting yourself in an according manner.

**CCE Honor Code:** While representing himself or herself as a member of the CCE community, the CCE student will maintain the highest standards of honesty and integrity. The student will strive for these standards in his or her representations, academic pursuits, research and scholarly activity, and respect for the property and individual rights of others; will uphold the specific principles described in the Code; and will actively support the Code.

In addition to this Honor Code, all CCE students are expected to know fully the OSU Student Conduct Regulations. Likewise, the CE student is expected to read and understand the American Society of Civil Engineers (ASCE) Code of Ethics, and the Oregon State Board of Examiners for Engineering and Land Surveying (OSBEELS) Rules of Professional Conduct. The CEM student is expected to read and understand the American Institute of Constructors (AIC) Code of Ethics, and the Construction Management Association of America (CMAA) Ethics Policy.

**Academic or Scholarly Dishonesty:**

You are expected to be honest and ethical in your academic work. OAR 576-015-0005(2) (see http://oregonstate.edu/studentconduct/code/) states that, “Students are also expected to follow the academic and professional standards of the academic units.” This document describes academic and scholarly dishonesty as follows:

a) **Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.**

b) **It includes:**
(i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

(ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone’s grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

(iv) TAMPERING - altering or interfering with evaluation instruments or documents.

(v) PLAGIARISM - representing the words or ideas of another person or presenting someone else’s words, ideas, artistry or data as one’s own, or using one’s own previously submitted work. Plagiarism includes but is not limited to copying another person’s work (including unpublished material) without appropriate referencing, presenting someone else’s opinions and theories as one’s own, or working jointly on a project and then submitting it as one’s own.

The administration of the classroom rests with the instructor. When evidence of academic dishonesty comes to the instructor’s attention, the instructor will (a) document the incident, (b) permit the accused Student to provide an explanation, (c) advise the Student of possible penalties, and (d) take action. The instructor may impose any academic penalty up to and including an “F” grade in the course after consulting with his school head and informing the Student of the action taken. Using the standard form, the instructor will report the incident and the action taken to his school head, who, in turn, shall forward the report to his dean.

For Students not enrolled in the College of Engineering, the Dean of the College of Engineering shall forward the report to the dean of the college or school in which the student is enrolled for possible disciplinary action.

Disruptive Behavior:

While the university is a place where the free exchange of ideas allows for debate and disagreement, all classroom behavior and discourse should reflect the values of respect and civility. Behaviors that are disruptive to the learning environment will not be tolerated. OSU’s policy on disruptive behavior may be found at: http://oregonstate.edu/studentconduct/faculty/disruptivebehavior.php