Boise State University
Foundational Studies Program Course Application Form
Due to the Foundational Studies Program by August 19, 2011

After the Foundational Studies Program has approved a course, departments will continue through the regular department and college procedures. The approved course should be submitted to the University Curriculum Committee by October 1, 2011.

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Instructions:

1. Complete one form per course.
2. Attach this Foundational Studies Course Application Form to the back of the University Curriculum Committee “Request for Curriculum Action” form. Both forms should be submitted to the Foundational Studies Program Office by August 19, 2011.

Part I. Course Information

Course Number and Title: ENGR 101: Introduction to Sustainable Building Science

Type of Foundational Studies Course – (Choose One):

[ ] DLS (Disciplinary Lens – Social Science)
[ ] DLL (Disciplinary Lens – Literature and Humanities)
[ ] DLV (Disciplinary Lens – Visual and Performing Arts)
[ ] DLM (Disciplinary Lens – Mathematics)
[x] DLN (Disciplinary Lens – Natural, Physical, and Applied Sciences)
   Includes Lab: [ ] Yes [x] No
[ ] CID (Communication in the Discipline)
[ ] FF (Finishing Foundations)

Delivery Format(s) – (Check all that apply):

[x] Face to Face
[x] Fully Online
[ ] Hybrid
[ ] Concurrent Enrollment
[ ] Other (briefly describe):
Part II. Syllabus Statement

Boise State’s Foundational Studies Program provides undergraduates with a broad-based education that spans the entire university experience. ENGR 100 satisfies 3 credits of the Foundational Studies Program’s Disciplinary Lens – Natural, Physical and Applied Science requirements. It supports the following University Learning Outcomes, along with a variety of other course-specific goals.

ULO 8. Apply knowledge and methods characteristic of scientific inquiry to think critically about and solve theoretical and practical problems about physical structures and processes.

ENGR 101: Introduction to Sustainable Building Science is designed to integrate course content with the opportunity to develop critical thinking skills important in the field of building design and operations. This course helps to achieve the goals of the Foundational Studies Program by focusing on the following course learning outcomes.

After successful completion of this course, you will be able to:

- Apply the principles of heat transfer, photometry, and acoustics to determine relative operating efficiency as well as effects on building occupant comfort.
- Identify factors that impact indoor air quality and explain how and why they affect human health.
- Evaluate various building design alternatives and tradeoffs from the sometimes conflicting standpoints of environmental sustainability, optimum building performance, and occupant comfort and health.

Part III. Design for Accessibility

In the space below, briefly describe plans for providing access to course materials and activities (or equivalent alternatives) to all students in adherence with the Americans with Disabilities Act. Although these plans may vary from instructor to instructor, the descriptions provided below should be representative of intended departmental and instructor practices. (See example statements appended to this form.)

ENGR 101: Introduction into Sustainable Building Science: Instructors will be encouraged to provide PowerPoint files with a textual transcript of the lecture and/or narrated lectures combining PowerPoint with the instructor’s voice. Images used in the Blackboard site will have appropriate textual descriptions that can be read by screen reader software. In all sections, students will be able to submit assessments in a variety of formats, including written papers and oral presentations or podcasts. Extra time on tests and other accommodations will be provided to students as needed per the policies of the Disability Resource center.
Part IV. Evidence of Quality Course Design

Please use the table below (column headings for this table should not be changed) to provide evidence that the course has been carefully designed and is clearly aligned with Foundational Studies Program desired ULOs. All sections of the course should share similar student learning outcomes. Teaching and Learning Activities and Assessment Methods may vary from instructor to instructor. Please use the table to report representative strategies that may be used. Assessment activities used for reporting to the Foundational Studies Program should be consistent across different sections of the course.

Please see below.
Boise State University  
Foundational Studies Course  
Spring 2014  

Course Number and Title: ENGR 101: Introduction to Sustainable Building Science

## Course Design Table

<table>
<thead>
<tr>
<th>Foundation ULO 8 Criteria</th>
<th>Foundation ULO 8 Notions of Exemplary Work</th>
<th>Course Learning Outcomes: By the end of this course, each student should be able to…</th>
<th>Assessment Method: Evidence of Student Learning</th>
<th>Planned Teaching &amp; Learning Activities / Pedagogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULO 8.1: Process of Inquiry and Analysis in Response to Evidence or Observation</td>
<td>Skillfully and thoroughly formulates a research question or testable hypothesis.</td>
<td>Describe the role of energy modeling in creating a sustainable building.</td>
<td>Assignment: List parameters that are part of a building energy model. For each parameter, predict how the model output would change with variations in the input values and how the output might impact sustainable building design.</td>
<td>Lecture; guest speaker with expertise in modeling; physical or virtual field trip to Integrated Design Lab; students experiment with models; text reading, study questions and practice quiz.</td>
</tr>
<tr>
<td>ULO 8.1: Process of Inquiry and Analysis in Response to Evidence or Observation</td>
<td>Constructs a model to test evidence and observations.</td>
<td>Give examples of interconnections and interrelationships among building systems.</td>
<td>Quiz: Identify two building systems that impact each other’s performance. Give an example of a trade-off that might occur in the design of these two systems.</td>
<td>Lecture; text reading, study questions and practice quiz (plus discussion forum for online section).</td>
</tr>
<tr>
<td>ULO 8.1: Process of Inquiry and Analysis in Response to Evidence or Observation</td>
<td>Skillfully uses model to either confirm existing explanations or formulate new hypotheses</td>
<td>Analyze and compare building performance via case studies (new construction and retrofit).</td>
<td>Group project: Review case studies for two different buildings (having similar functions – e.g. two schools or two office buildings) and prepare a report that compares and contrasts the actual (or predicted) energy efficiencies and occupant comfort. Make a recommendation for the most efficient and / or comfortable building and provide justification.</td>
<td>Lecture; students select case studies of interest from a library provided by instructor; groups with similar building types work together initially to create a list of parameters to compare and contrast; instructor provides links to online reference materials for groups to discover parameters for their reports. Instructor facilitates group formation and process based on case study interest.</td>
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</tbody>
</table>
| ULO 8.2: Understanding of Knowledge and Inquiry | * Clearly understands the difference between evidence (data) and explanation (theory)  
* Is able to connect evidence & explanation to build an argument  
* Understands the role of these kinds of arguments in building knowledge in the discipline | Apply the principles of heat transfer, photometry, and acoustics to determine relative operating efficiency as well as effects on building occupant comfort. | Group practice in-class, Individual Assignments and Quiz: Given various conditions, calculate building energy performance, the performance of natural and artificial lighting, and noise levels. Provide a brief interpretation of the results with respect to occupant comfort. | Lecture, text reading, study questions, practice quiz, in-class or online discussions, group problem-solving sessions, scavenger hunt, personal experience survey and reflection. |
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| ULO 8.3: Communication of Scientific and/or Technological Understandings | * Produces clear, accurate, well-organized written and oral communications about scientific and technological understandings  
* Use of scientific language, representational tools, and notation covered in the course is skillful. | * Define terms of building science.  
* Identify common performance indicators of building energy efficiency.  
* Explain the effects of air flow, temperature and moisture on building occupant comfort. | * Quiz: Identify correct definitions by multiple choice, true / false, matching and fill-in-the-blank.  
* Quiz: Identify correct definitions by multiple choice, true / false, matching and fill-in-the-blank.  
* Group Assignment and oral presentation: Prepare a one-page reference, using a written description or labeled diagram (or a combination) to explain the effects of air flow. | * Lecture, text reading, study questions and practice quiz.  
* Lecture, text reading, study questions and practice quiz (plus discussion forum for online section).  
* Live presentation or narrated presentation or podcast. |
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<td>ULO 8.4: Understanding of interactions of science and technology with humans and environment</td>
<td>Skillfully assesses the potential connection of scientific and/or technological developments to humans and the environment</td>
<td>Identify factors that impact indoor air quality and explain how and why they affect human health.</td>
<td>Individual Assignment: Research one factor that affects indoor air quality and write a paper about the impact on human health. Quiz: Identify correct definitions by multiple choice, true / false, matching and fill-in-the-blank; Assignment and Quiz: Use the psychometric chart to find the moisture properties of indoor air at various temperatures.</td>
<td>Lecture, text reading, study questions and practice quiz (plus discussion forum for online section).</td>
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<td>ULO 8.4: Understanding of interactions of science and technology with humans and environment</td>
<td>Able to articulate possible implications of these relationships</td>
<td>Evaluate various building design alternatives and tradeoffs from the sometimes conflicting standpoints of environmental sustainability, optimum building performance, and occupant comfort and health.</td>
<td>Group project: Given a building type and geographic location, propose two different designs and two different site orientations. Evaluate the design and orientation scenarios from the standpoint of impact on the environment, energy efficiency, and thermal, lighting and acoustic aspects of occupant comfort and health. Make a recommendation for the most sustainable building and provide justification.</td>
<td>Lecture, assigned readings, group project, oral and/or poster presentation in a public forum. Students select building of interest from a library provided by instructor or propose their own; groups with similar building types work together initially to create a list of parameters to compare and contrast; instructor provides links to online reference materials for groups to discover parameters for their projects.</td>
</tr>
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</table>

5-16-2013

Foundational Studies Program Director Signature

Date