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 130/130L: Introduction to Engineering Applications

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: [x] Yes [ ] No

[ ] CID (Communication in the Discipline)
[ ] FF (Finishing Foundations)

Delivery Format(s) – (Check all that apply):
[x] Face to Face
[ ] 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 130/130L 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 130/130L: Introduction to Engineering Applications teaches students to use critical thinking and gain design-oriented engineering experiences by working through projects that expose them to the engineering disciplines. Professional skill development includes teamwork, oral and written communication, and professional/ethical responsibility. Students will experience the satisfaction in solving a client’s real-world problem as they apply the engineering design process to design and deliver a solution. See http://coen.boisestate.edu/FUSE/index.html.

(PREREQ: MATH 143 or MATH 147 or satisfactory placement score.) 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:

• Using the project design specifications provided as a testable design goal, students, design, build and evaluate prototypes against these specifications.
• Design, develop and build a solution for a real-world, community-based design goal by applying the engineering design process.
• Compile, evaluate and present engineering data to inform decisions and plans.
• Produce a high-quality report, written or oral, which summarizes the pertinent project details and incorporates appropriate data to justify their decisions.
• Identify the contributions that engineers make to society, in general and by specific disciplines.
• Students relate work on their service project to the impact it has on their client’s life.

Note: students may not take both ENGR 120 and ENGR 130 for course credit.

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 130/130L: Introduction to Engineering Applications: The laboratory for this course has been recently redesigned and meets ADA specifications for accessibility. In the lecture, the materials are provided in PowerPoint files. Instructors will be encouraged to provide 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, as needed, 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.
Course Number and Title: ENGR 130/130L: Introduction to Engineering Applications

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><strong>ULO 8.1: Process of Inquiry and Analysis in Response to Evidence or Observation</strong></td>
<td>Skillfully and thoroughly formulates a research question or testable hypothesis. * Constructs a model to test evidence and observations * Skillfully uses model to either confirm existing explanations or formulate new hypotheses</td>
<td>Using the project design specifications provided as a testable design goal, students, design, build and evaluate prototypes against these specifications. Design, develop and build solution for a real-world, community-based design goal by applying the engineering design process.</td>
<td>Students will self-evaluate their design/prototype to quantify how well it meets the specifications provided. This analysis will be included in their end-of-project summary report. Develop a rubric to analyze one or two project summary reports to assess student’s ability to design solution per the given specifications. Reports for all lab sections will be evaluated and summarized. This is already done on a periodic basis as part of the engineering (ABET) accreditation process. Students will be provided with a high-level problem statement. Through observing and interviewing their client, they will gain a deep understanding of the problem to be solved. They will apply the engineering design process to design, build and deliver a solution to their client. High quality work will demonstrate a strong link between the design specifications/problem statement and decisions made throughout the design process.</td>
<td>Students will “learn by doing” in this project-based class. Most projects include a design, test, redesign step. Lab activities and homework assignments will guide students through steps in each project. The process for redesigning a mousetrap will be discussed in class to help students understand the steps in the engineering design process. Mentors will guide students in helping them to consider appropriate alternatives, and evaluate their designs. Students will share their work with classmates via an oral presentation as part of a design review. This will help ensure a thorough approach has been followed.</td>
</tr>
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<tr>
<td>ULO 8.2: Understanding of Knowledge and Inquiry</td>
<td>Clearly understands the difference between evidence (data) and explanation (theory)</td>
<td>Compile, evaluate and present engineering data to inform decisions and plans</td>
<td>Students will gather data as they test their products / designs. Product refinements or recommendations for future product refinements will be based upon analysis of their test data. The data summary and analysis will be included in the final project report.</td>
<td>Students will be presented several examples of data and will be asked to make recommendations or draw conclusions based on the data through class discussions, homework and quizzes.</td>
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<tr>
<td></td>
<td>Is able to connect evidence &amp; explanation to build an argument</td>
<td></td>
<td>Develop a rubric to analyze one or two project summary reports to assess student’s ability to effectively use test data to inform product design refinements. Reports for all lab sections will be evaluated and summarized. This is already done on a periodic basis as part of the engineering (ABET) accreditation process.</td>
<td>Students will be required to collect and analyze data as part of their daily lab activities. Lab instructors will be available to assist them in analyzing data. One example is where student will calculate the standard deviation for mass and thickness of the peanut butter cracker sandwiches they manufacture. Compare results from each test run and use this data to inform their process changes.</td>
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<td></td>
<td>* Understands the role of these kinds of arguments in building knowledge in the discipline</td>
<td></td>
<td>High quality work will demonstrate a strong, logical connection between the data and the product refinements next steps.</td>
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</tr>
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<td><strong>ULO 8.3:</strong> Communication of Scientific and/or Technological Understandings</td>
<td>Produces clear, accurate, well-organized written and oral communications about scientific and technological understandings</td>
<td>Produce high-quality report, written or oral, which summarizes the pertinent project details and incorporates appropriate data to justify their decisions.</td>
<td>Students will compile a summary of their design project into an oral or written report per an outline provided. Develop a rubric to analyze project summary reports, one written and one oral to assess student’s ability to communicate effectively. Reports for all lab sections will be evaluated and summarized. This is already done on a periodic basis as part of the engineering (ABET) accreditation process.</td>
<td>Evaluate writing samples with in-class examples, quizzes and homework and make suggestions / edit to improve clarity of writing. Students will be asked to explain the key elements in creating and delivering an effective oral presentation.</td>
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<td></td>
<td>* Use of scientific language, representational tools, and notation covered in the course is skillful.</td>
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High quality work will result in a clear, accurate and easily understood summary report that effectively incorporates and references data to justify design decisions.
| ULO 8.4: Understanding of interactions of science and technology with humans and environment | Skillfully assesses the potential connection of scientific and/or technological developments to humans and the environment | Identify the contributions that engineers make to society, in general and by specific disciplines. Students relate work on their service project to the impact it has on their client’s life | Develop a reflective assignment or discussion where students articulate how engineers from each discipline contribute to solving society’s problems. Results that assess students’ developing understanding will be assessed (e.g. through before and after comparison of clicker question data.) Students will provide thoughtful answers to a series of reflection questions to help them internalize how their work is impacting their client’s quality of life. | Students will participate in class discussions which demonstrate the vast opportunities for engineers. Examples of clever solutions developed to solve society’s problems will be featured throughout the class. Students will identify a product and provide examples of the contribution made by engineers from each discipline. |

5-16-2013

Foundational Studies Program Director Signature

Date