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.

Table of Contents (Click title to go to that section)

Instructions: .................................................................................................................................................. 1
Part I. Course Information.................................................................................................................................. 1
Part II. Syllabus Statement ................................................................................................................................... 2
Part III. Design for Accessibility ............................................................................................................................. 3
Part IV. Evidence of Quality Course Design ........................................................................................................... 3
Course Design Table .............................................................................................................................................. 4

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: ME 310: Experimental Methods Lab

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)
[ ] DLN (Disciplinary Lens – Natural, Physical, and Applied Sciences)
  Includes Lab: [ ] Yes [ ] No
[ ] CID (Communication in the Discipline)
[ ] FF (Finishing Foundations)

Delivery Format(s) – (Check all that apply):
[ ] 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. ME 310 satisfies 1 credits of the Foundational Studies Program's Communication in the Discipline requirements. It supports the following University Learning Outcomes, along with a variety of other course-specific goals.

ULO 1. Write effectively in multiple contexts for a variety of audiences
ULO 2. Communicate effectively in speech, both as a speaker and listener
ULO 3. Engage in effective critical inquiry by defining problems, gathering and evaluating evidence, and determining the adequacy of argumentative discourse.
ULO 7. Apply knowledge and the methods of reasoning characteristic of mathematics, statistics, and other formal systems to solve complex problems.
ULO 8. Apply knowledge and the methods characteristic of scientific inquiry to think critically about and solve theoretical and practical problems about physical structures and processes.

ME 310: EXPERIMENTAL METHODS LAB (1-2-2)(F/S): Instrumentation, data acquisition, and theory verification in the engineering sciences. Emphasis placed on experimental procedure, uncertainty analysis, and technical communication. (Prerequisites: ENGR 240, ENGR 331, and MATH 360 or MATH 361)

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

• Read a spec sheet from a sensor manufacturer and apply those data to the analysis of measurements made from that sensor.
• Integrate their knowledge of engineering principles with the operation of various transducers used to measure strain, temperature, flow, pressure, force, voltage and current.
• Recognize sources of uncertainty in measurement systems and account for many of them in analysis
• Properly compute the manner in which uncertainty propagates through computations on measured data.
• Analyze measurement data by applying the fundamental statistical concepts such as Sample, Population, Mean, and Variance to engineering experiments and use these analyses to draw correct conclusions from measured data.
• Design experiments in which multiple factors are varied by applying the basic principles of “Design of Experiments” in an engineering setting
• Present the results of an experimental program in a concise, complete and professional manner in written, oral and poster formats.
• Critically analyze statistical analyses of experimental data performed and presented by others
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.)

ME 310: Experimental Methods Lab: Course materials will be provided in formats (large font, visual materials, verbal recordings with closed captioning, etc.) on a case by case basis such that all students have the opportunity complete assignments successfully. Access to laboratory equipment and/or data will be provided to accommodate student abilities and needs. Extra time on tests, oral examinations, or 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: ME 310: Experimental Methods Lab

Course Design Table
<table>
<thead>
<tr>
<th>Foundation ULO 1 &amp; 2 Criteria</th>
<th>Foundation ULO 1 &amp; 2 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>
</table>
| ULO 1.1-1.6: Write effectively | * Focuses narrowly on a clear purpose  
* Adopts an appropriate voice, tone, & level of formality  
* Uses the text conventions of writing in a field professionally  
* Evaluates & synthesizes ideas from sources well; documents sources  
* Improves across series of drafts that are the result of drafting, revising and editing in response to feedback  
* Controls mechanical features such as syntax, grammar, and punctuation  
* Uses wide variety of resources to locate sources  
* Focuses on a compelling central message that is precisely stated, appropriately repeated, memorable, and strongly supported  
* Offers a variety of supporting materials that are relevant to the central message, appropriate to the occasion, and in a variety of appropriate media (oral, written, media-supported) and establish the speaker’s credibility and authority  
* Uses an organization pattern that is clear and consistently observable and makes content cohesive in creative ways  
* Makes imaginative, memorable, and compelling language choice with a tone appropriate to the audience and occasion  
* Uses compelling and appropriate delivery techniques (posture, vocal expressiveness, audience interaction) so that speaker appears prepared, polished, and confident | Present the results of an experimental program | * Written lab reports  
* Oral presentation of results | Lecture |
<p>| ULO 1.9: Write in multiple contexts: Research | | | | |
| ULO 2.1-2.5: Communicate effectively as speaker | | | | |</p>
<table>
<thead>
<tr>
<th>Foundation ULO 1 &amp; 2 Criteria</th>
<th>Foundation ULO 1 &amp; 2 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>
</table>
| ULO 2.1-2.6: Communicate effectively as speaker and listener | * Focuses on a compelling central message that is precisely stated, appropriately repeated, memorable, and strongly supported  
* Offers a variety of supporting materials that are relevant to the central message, appropriate to the occasion, and in a variety of appropriate media (oral, written, media-supported) and establish the speaker’s credibility and authority  
* Uses an organization pattern that is clear and consistently observable and makes content cohesive in creative ways  
* Makes imaginative, memorable, and compelling language choice with a tone appropriate to the audience and occasion  
* Uses compelling and appropriate delivery techniques (posture, vocal expressiveness, audience interaction) so that speaker appears prepared, polished, and confident  
* Responds with critical understanding of oral communication of ideas | Read a spec sheet | Equipment specification in lab reports | * Lecture  
* Lab |
| ULO 3.2: Collecting and organizing evidence/data/reasons  
ULO 8.2: Understanding of knowledge and inquiry | * Adheres to and clearly explains/justifies disciplinary best practices with respect to thoroughness and accuracy of data collection (examples: literature review, fieldwork, surveys, experimental procedures)  
* Clearly understand the difference between evidence (data) and explanation (theory); is able to connect evidence and explanation to build an argument and understand the role of these kinds of arguments in building knowledge in the discipline | Integrate their knowledge of engineering principles with the operation of various measurement instruments | Interface transducers and thermocouples with computer devices and software | * Lecture  
* Lab demonstrations |
<table>
<thead>
<tr>
<th>Foundation ULO 1 &amp; 2 Criteria</th>
<th>Foundation ULO 1 &amp; 2 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 3.3: Evaluative reasoning</td>
<td>* Accurately diagnoses failures of reasoning and clearly distinguishes different grades of reasoning quality according to discipline-specific evaluative standards</td>
<td>Analyze measurement data</td>
<td>Presentation and analysis of data in lab reports</td>
<td>* Lecture * Lab</td>
</tr>
<tr>
<td>ULO 7.4: Formulate and justify generalizations</td>
<td>* Recognizes common structure across problems in context; creates logical arguments to support claims</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ULO 8.1: Process of inquiry and analysis in response to evidence or observations (could be either group or individual)</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></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ULO 7.4: Formulate and justify generalizations</td>
<td>Recognizes common structure across problems in context; creates logical arguments to support claims</td>
<td>Critically analyze statistical analyses of experimental data</td>
<td>* Written lab reports * Oral presentation of results</td>
<td>Lecture</td>
</tr>
<tr>
<td>ULO 7.5: Use appropriate technology as a tool for problem solving</td>
<td>Selects and effectively uses appropriate technological tools</td>
<td>Recognize sources of uncertainty</td>
<td>Uncertainty analysis in lab reports</td>
<td>Lecture</td>
</tr>
<tr>
<td>Foundation ULO 1 &amp; 2 Criteria</td>
<td>Foundation ULO 1 &amp; 2 Notions of Exemplary Work</td>
<td>Course Learning Outcomes: By the end of this course, each student should be able to…</td>
<td>Assessment Method: Evidence of Student Learning</td>
<td>Planned Teaching &amp; Learning Activities / Pedagogy</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
</tbody>
</table>
| ULO 7.1: Apply quantitative reasoning methods to draw appropriate conclusions | * Solves routine problems and correctly interprets results  
* Clearly understand the difference between evidence (data) and explanation (theory); is able to connect evidence and explanation to build an argument and understand the role of these kinds of arguments in building knowledge in the discipline | Properly compute the manner in which uncertainty propagates | Uncertainty analysis in lab reports | Lecture |
| ULO 8.2: Understanding of knowledge and inquiry | 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 | Design experiments in which multiple factors are varied | Design of experiments (DOE) matrices and descriptions in lab reports | Lecture |

5-16-2013

Foundational Studies Program Director Signature  
Date