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 departmental and college procedures. The approved course should be submitted to the University Curriculum Committee by October 1, 2011.

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 1. Course Information

<table>
<thead>
<tr>
<th>Course Number and Title: <strong>ME 481 Senior Design Project I</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Foundational Studies Course - (choose one):</td>
</tr>
<tr>
<td>[ ] DLS (Disciplinary Lens – Social)</td>
</tr>
<tr>
<td>[ ] DLL (Disciplinary Lens – Literature and Humanities)</td>
</tr>
<tr>
<td>[ ] DLV (Disciplinary Lens – Visual and Performing Arts)</td>
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<td>[ ] DLM (Disciplinary Lens – Mathematics)</td>
</tr>
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<td>[ ] DLN (Disciplinary Lens – Natural, Physical and Applied Sciences)</td>
</tr>
<tr>
<td>[ X ] FF (Finishing Foundations)</td>
</tr>
</tbody>
</table>

| Delivery Format(s) - (check all that apply):                  |
| [X] Face to Face                                             |
| [ ] Fully Online                                             |
| [ ] Hybrid                                                  |
| [ ] Concurrent Enrollment                                    |
| [ ] Other (briefly describe):                                |

Part II. Syllabus Statement

In the space below, include the syllabus statement for this course which will appear on the first page of the syllabus for each section of this course. (Template and examples are appended to this application form.) Attach additional pages if needed.

Boise State's Foundational Studies Program provides undergraduates with a broad-based education that spans the entire university experience. **ME 481** provides 3 credits of the Foundational Studies Program “Final Foundations” (FF) requirements. It supports the following University Learning Outcomes (ULO), 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 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 - 4. Think creatively about complex problems in order to produce, evaluate, and implement innovative possible solutions, often as one member of a team.
ULO – 7. Apply knowledge and the methods of reasoning characteristic of mathematics, statistics, and other formal systems to solve complex problems.

COURSE DESCRIPTION:
ME 481 SENIOR DESIGN PROJECT I (2-3-3)(F). First course for mechanical engineers in capstone design. Integration of previous course work with modern design theory, methodology, teamwork and project management. Comprehensive group projects include determining customer requirements, developing design specifications, preparing concept and configuration designs, documentation and presentation.

PREREQUISITES:
• ME 380, ME 320 and ME 352

CO-REQUISITE COURSES:
• ME 424 and ME 462

TEXTBOOKS USED:
• N/A

COURSE LEARNING OUTCOMES:
Your primary learning objective is to: learn how to plan, execute and manage an engineering design.
At the end of the course, students will be able to:

Knowledge Related
• identify and define design phases
• define and describe key elements of design process
• define, generate, and use project management tools: Gant charts, PERT charts, budgets, milestones, critical path
• define and provide examples of product cycle time, deliverables, customer-vendor relationships, cross-functional teams and concurrent engineering
• define and identify team roles and teamwork principles
• define and recognize intellectual property rights issues
• define, recognize, and practice professional ethics and behavior
• describe the significance and relationship of their work to society’s needs and concerns

Skills Related
• identify customer requirements
• translate customer requirements into engineering specifications
• identify and communicate design constraints
• identify and distinguish design parameters and variables from performance variables and constraints
• participate in the creative process and generate design alternatives
• evaluate design alternatives
• acquire and evaluate appropriate background material relating to a design
• solicit and assess critical reviews of a design and design processes
• communicate the design verbally, graphically and in written form

**TOPICS COVERED:**
• Design Process – a review
• Defining user needs
• Defining project objectives
• Design specifications
• Feasibility Screening
• Decision making
• Trade-offs
• Parametric Design
• Configuration Design
• Optimization
• Project management
• Successful Meetings
• Teamwork and Self Directed Teams
• Creativity
• Technical Writing
• Learning Styles
• Leadership

**CLASS/LAB SCHEDULE:**
• A 1-hour lecture each week
• Two 2 hour laboratories each week

**ASSESSMENT METHODS (INCLUDING COMPUTER USAGE AND DESIGN CONTENT):**
• Homework
• Reports of various types
• Oral presentations
• Final project reports
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.) Attach additional pages if needed.

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

Attach a separate document including a table like the one below. (A link to the Word template that allows rows to be adjusted as needed may be found at: Course Design Table. Column headings for this table should not be changed.) The purpose of the table is 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.

<table>
<thead>
<tr>
<th>Foundational Studies ULO Criteria and Notions of Exemplary Work</th>
<th>Course Learning Outcomes</th>
<th>Assessment Method: Evidence of Student Learning</th>
<th>Planned Teaching and Learning Activities/ Pedagogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>These are drawn from the appropriate rubric for the ULO supported by the course.</td>
<td>“By the end of this course, each student should be able to…”</td>
<td>How will the outcomes be assessed in the course? (Note key assessments to be used for reporting student learning outcomes.)</td>
<td>What kind of activities will be used to support students' success on the planned assessments?</td>
</tr>
<tr>
<td>See Attached Table</td>
<td>All learning outcomes are listed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part V. Additional Justification (optional)

If the brief justification provided to the University Curriculum Committee in the proposal to accompany the “Request for Curriculum Action” is not sufficient to make the case for including the course in the Foundational Studies Program, additional (optional) narrative can be added here.

Electronic signature on course application evaluation form below

Foundational Studies Program, Director Date
Boise State University  
Foundational Studies Course  
Fall 2011

Course Number and Title: ME 481 Senior Design Project I

### Course Design Table

<table>
<thead>
<tr>
<th>Foundational Studies ULO Criteria and Notions of Exemplary Work</th>
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<th>Assessment Method: Evidence of Student Learning</th>
<th>Planned Teaching and Learning Activities/ Pedagogy</th>
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</thead>
<tbody>
<tr>
<td>Phrases are drawn from the appropriate rubric for the ULO supported by the course. ULOs listed below.</td>
<td>All learning outcomes are listed.</td>
<td>How will the outcomes be assessed in the course? (Note key assessments to be used for reporting student learning outcomes.)</td>
<td>What kind of activities will be used to support students’ success on the planned assessments?</td>
</tr>
<tr>
<td>ULO 4. all rubrics: contribution, facilitation, conflict, etc</td>
<td>define and identify team roles and teamwork principles</td>
<td>Peer evaluations will be completed by the students based on the team charters created by the group in the formation of the team. These evaluations will be used by both the instructor and the students to improve the quality of work and dynamics of the group.</td>
<td>All students will be placed in a team of 2-4 members. A teamwork lecture will be presented along with an initial teamwork in class activity. Each team will complete a team charters prior to start of work. Upon completion of the charter, each team will meet with the instructor for a one-one conversation about team dynamics.</td>
</tr>
<tr>
<td>ULO 1. purpose ULO 2. listener</td>
<td>identify customer requirements</td>
<td>A progress report laying out the customer requirements of the main team project assigned will be completed at the start of the project. This report will be reviewed by both the project customer and the class instructor.</td>
<td>Using the class text, an example of identifying customer requirements will be completed in class in conjunction with a lecture. Homework will then be assigned to verify understanding prior to start of team projects.</td>
</tr>
<tr>
<td>ULO 4. divergent/convergent thinking</td>
<td>translate customer requirements into engineering specifications</td>
<td>The progress report including customer requirements will also include translated engineering specifications of the main team project will be completed at the start of the project. This report will be reviewed by both the project customer and the class instructor.</td>
<td>Using the class text, an example of identifying customer requirements and translating them into qualitative or quantitative engineering specifications will be completed in class in conjunction with a lecture. Homework will then be assigned to verify understanding prior to start of team projects.</td>
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<tr>
<td>ULO 7. quantitative reasoning ULO 1. purpose &amp; conventions ULO 2. message, language, &amp; delivery</td>
<td>identify and communicate design constraints</td>
<td>The progress report including customer requirements and engineering specifications will also include design constraints of the main team project will be completed at the start of the project. This report will be reviewed by both the project customer and the class instructor. An oral presentation will also be completed by each team with design constraints covered.</td>
<td>Using the class text, an example of identifying customer requirements and design constraints will be completed in class in conjunction with a lecture. Homework will then be assigned to verify understanding prior to start of team projects.</td>
</tr>
<tr>
<td>ULO 4. Innovative thinking ULO 7. appropriate strategy &amp; appropriate tools</td>
<td>participate in the creative process and generate design alternatives</td>
<td>Each team will complete an oral presentation including critically evaluating two or more design alternatives requiring the group to develop design alternatives based on customer requirements, design specifications and constraints.</td>
<td>An in class exercise on “thinking outside the box” will be followed by a lecture on process based techniques for creative problem solving and thinking</td>
</tr>
<tr>
<td>ULO 3. evaluative reasoning ULO 7. appropriate strategy &amp; quantitative reasoning</td>
<td>evaluate design alternatives</td>
<td>Detailed engineering calculations will be completed during the design phase leading the students to specific design parameters. They will then create a progress report outlining a decision matrix demonstrating understanding of the design problems and customer requirements.</td>
<td>Design alternatives and decision making will be covered in class with examples from the text as well as past projects completed by the instructor.</td>
</tr>
<tr>
<td>ULO 1. conventions, revision, mechanics, strategies, research</td>
<td>ULO 2. message, organization, support, language, delivery</td>
<td>ULO 7. quantitative reasoning</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>acquire and evaluate appropriate background material relating to a design</td>
<td>communicate the design verbally, graphically and in written form</td>
<td>In a progress report, the students will complete an Intellectual Properties search for full understanding of the design project as it currently is implemented. Students will also include facts collected from their customer relating to the project assigned on a progress report and proposal.</td>
<td></td>
</tr>
<tr>
<td>A guest lecture with expertise in Intellectual Properties will present specifics required to complete the project to the students.</td>
<td>The oral report completed by each team will be accompanied by an electronic presentation form (ex. ppt) and will include design parameter and decisions. A final design proposal will also be completed at the end of the semester containing design calculations, 3D modeling data, and written explanations of design specifics.</td>
<td>Oral reporting expectations will be discussed in class along with a grading form posted for student review prior to the presentation. Each student in ME 481 will have completed a technical communications class prior to entering the class. Peer reviews of the final proposal will be completed prior to submittal.</td>
<td></td>
</tr>
</tbody>
</table>

ULO:
1. Write effectively in multiple contexts, for a variety of audiences.
2. Communicate effectively in speech, both as speaker and listener.
3. Engage in effective critical inquiry by defining problems, gathering and evaluating evidence, and determining the adequacy of argumentative discourse.
4. Think creatively about complex problems in order to produce, evaluate, and implement innovative possible solutions, often as one member of a team.
5. Apply knowledge and the methods of reasoning characteristic of mathematics, statistics, and other formal systems to solve complex problems.
Boise State University  
Foundational Studies Review Committee: Course Application Evaluation Form  
Fall 2011

Course Information

<table>
<thead>
<tr>
<th>Course Number and Title: ME 481and 3 – Senior Design Project I and II</th>
<th>Number of Credits: 2 and 3</th>
</tr>
</thead>
</table>

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 – Math)
- DLN (Disciplinary Lens – Natural, Physical and Applied Science)
- CID (Communication in the Discipline)
- FF (Finishing Foundations)

Review Committee Checklist

_x_ Syllabus Statement - statement introduces the student to the purpose and role of the course in the Foundational Studies Program curriculum.

_x__ An appropriate number of Course Learning Outcomes are specified for the course and are clearly designed to support the Foundational Studies Program ULOs.

_x__ Course Learning Outcomes are appropriately designed for level of the course and address both content mastery and skill-based outcomes.

_x__ The types and numbers of assessments planned for the course are appropriate for measuring the content or skills being assessed

_x__ Course learning activities are likely to promote the achievement of the stated outcomes

_x__ Course design and materials have considered best practices for accessibility to course materials and ideas by all students (e.g., alternatives to auditory and visual content)

Feedback from Review Committee: (this includes feedback from both courses).

Note: These are the comments that came with our first proposal. This proposal addresses their concerns by making a single course, ME 481 our FF course for MBE.

The syllabus statements for both courses are good.

The committee has a concern for the teaching and learning activities being lectures for all ULOs in both classes. That is, how would lecturing teach innovation, or critical inquiry, or writing effectively? Column 4 of the table merits revision. If an example is needed, BIOL 415 has suitable column 4 pedagogy.

These proposals address ULOs 1, 2, 3, 4, 5, 6, 7, AND 8! This is above and beyond what a FF course must demonstrate. The proposal may, if they wish, remove the references to 5, 6, 7 and 8 in the table.

The course appears to be a genuine capstone course that will meet the appropriate university learning outcomes for a finishing foundations course. Has been taught before and is already routinely assessed for engineering accreditation purposes.
Comment: only one course needs to be a FF course; this program has two. To keep it simpler, the committee wonders if only ME 483 could be listed. All other finishing foundations proposals considered by the committee had one course evaluated.

Feedback will be shared with department for consideration in implementation.

Feedback on the FF in general, will be taken under advisement FSP

Certified as is for Foundational Studies Program by Sharon McGuire, September 1, 2011.

Revision accepted by Vicki Stieha 10/3/2011

Electronically signed by Vicki Stieha, Director, Foundational Studies Program
Boise State University