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<td>1. Prior to graduation, students will demonstrate an ability to apply knowledge of mathematics, science, and engineering.</td>
<td><strong>Direct Measure</strong> Performance on the mathematics and introductory engineering science sections (Statics and Dynamics) of the Fundamentals of Engineering Exam (FE Exam), administered by the National Council of Engineering Examiners (NCEES)</td>
<td><strong>Direct Benchmarks</strong> The mean scores on these sections for UI Civil Engineering students should be within 10% of the ratio scores reported by NCEES for BSCE students at ABET Comparator Institutions over a five-year period.</td>
<td><strong>Direct Findings</strong> The following values represent the FE Exam score ratios of UI exam takers with those at ABET comparator institutions as reported by NCEES on specific sections of the exam, where 1.00 represents identical mean scores between the two groups: Mathematics = 0.91 Statics = 1.00 Dynamics = 0.93</td>
<td>The overall pass rate for UI students who took the FE exam in AY 2015-16 was 84% compared to the national average for the two exams in this period of on 69%. All of the section scores met or exceeded our benchmark that they fall within 10% of the mean values of scores by other BSCE students who took the exam at ABET comparator institutions. We are generally satisfied with our students' performance on last year's FE Exam; however, since licensure is critical to career success in the Civil Engineering profession, we need to do a better job of encouraging students to take the Fundamentals of Engineering Exam.</td>
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| 2. Prior to graduation, students will demonstrate an ability to design a system, component or process to meet desired needs within realistic constraints (e.g., economic, environmental, social, political, ethical, health and safety, and sustainability). | **Direct Measure**
The CE 494/Senior Design Project design reports are evaluated by the course instructor. The reports are evaluated for format, content, organization and completeness and should meet professional standards. | **Direct Benchmarks**
The average score for student design projects and reports will be 80% or higher. **Indirect Benchmarks**
We would expect no fewer than 90% of students reporting being "well prepared" or "somewhat prepared". | **Direct Findings**
The mean score on design reports and projects in Spring 2016 was 94%. All project scores were above 80%. **Indirect Findings**
Based on exit surveys, 50% of graduating seniors agree that they are 'well prepared' to apply both analysis and synthesis in the engineering design process. The balance of survey takers said they felt 'somewhat prepared'. | Students continue to perform consistently on a very high level on the various aspects of this outcome. There is a great deal of mentoring and coaching that occurs in CE 494, from both the instructor and other faculty members who critique student performance throughout the semester, which likely accounts for students meeting (and often exceeding) expectations for this outcome. We will continue to mentor students in this fashion and keep our expectations high. |
| **Aligns with University Learning Outcome(s):** Think and Create | **Indirect Measure**
In a written exit survey, graduating seniors are asked to rate 'their ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs'. The scale used was 'Well Prepared', 'Somewhat Prepared', and 'Unprepared'. | **Face-to-Face Findings** | | |
Learning Outcome(s)

3. Prior to graduation, students will demonstrate an ability to function on multi-disciplinary teams.

**Aligns with University Learning Outcome(s):**
- Practice Citizenship

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**Assessment Tools and Procedures**

**Direct Measure**
Students and instructors will evaluate the students' teamwork in their Senior Design projects. The course instructor will ensure that Senior Design projects include aspects from at least two areas of civil engineering.

**Indirect Measure**
In a written exit survey, graduating seniors are asked to rate their ability to function on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty. The scale used was 'Well Prepared', 'Somewhat Prepared', and 'Unprepared'.

**Face-to-Face Measures**

**Benchmarks**

**Direct Benchmarks**
Peer evaluations will ask students to agree or disagree that their fellow project team members contributed at least 80% to the team. We would expect that all responses would be equal to or greater than 80%.

**Indirect Benchmarks**
We would expect no fewer than 80% of students reporting being "well prepared" or "somewhat prepared".

**Findings**

**Direct Findings**
Results of peer assessment from Spring 2016 suggest that all students agreed their team members contributed to at least 80% or greater to the team. Three of the 28 students reported that their peers 'significantly degraded' teamwork; however, they still ranked their contributions as 81%, 82% and 84%.

**Indirect Findings**
Results of the exit surveys suggest that almost all graduating seniors (96%) feel they are able to function effectively in teams.

**Curricular and Co-Curricular Changes to be Made**

Since we emphasize teamwork and collaboration throughout the curriculum, we do not feel we currently have any problems in meeting this outcome. No action is required at this time.
Learning Outcome(s) | Assessment Tools and Procedures | Benchmarks | Findings | Curricular and Co-Curricular Changes to be Made
--- | --- | --- | --- | ---
4. Prior to graduation, students will demonstrate an ability to identify, formulate, and solve engineering problems.

**Aligns with University Learning Outcome(s):**
Think and Create

**Direct Measure**
Performance on the more advanced engineering science sections (Mechanics of Materials, Fluid Mechanics, Hydraulics) of the Fundamentals of Engineering Exam (FE Exam), administered by the National Council of Engineering Examiners (NCEES)

**Indirect Measure**
In a written exit survey, graduating seniors are asked to rate their ability 'to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions'. The scale used was 'Well Prepared', 'Somewhat Prepared', and 'Unprepared'.

**Face-to-Face Measures**

**Direct Benchmarks**
The mean scores on these sections for UI Civil Engineering students should be within 10% of the ratio scores reported by NCEES for BSCE students at ABET Comparator Institutions over a five-year period.

**Indirect Benchmarks**
We would expect no fewer than 80% of students to have rated their ability as "well prepared" or "somewhat prepared".

**Direct Findings**
The following values represent the FE Exam score ratios of UI exam takers with those at ABET comparator institutions as reported by NCEES on specific sections of the exam, where 1.00 represents identical mean scores between the two groups: Mechanics of Materials = 0.94 Fluid Mechanics = 1.00 Hydraulics & Hydrology = 0.90

**Indirect Findings**
Results of the exit surveys suggest that almost all graduating seniors (96%) feel they are able to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

**Face-to-Face**

The overall pass rate for UI students who took the FE exam in AY 2015-16 was 84% compared to the national average for the two exams in this period of 69%. All of the section scores met or exceeded our benchmark that they fall within 10% of the mean values of scores by other BSCE students who took the exam at ABET comparator institutions. We are generally satisfied with our students' performance on last year's FE Exam; however, since licensure is critical to career success in the Civil Engineering profession, we need to do a better job of encouraging students to take the Fundamentals of Engineering Exam.
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| 5. Prior to graduation, students will demonstrate an understanding of professional and ethical responsibility. | **Direct Measure**
Performance on the ethics section of the Fundamentals of Engineering Exam, administered by the National Council of Engineering Examiners (NCEES)

**Indirect Measure**
In a written exit survey, graduating seniors are asked to rate 'their ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments'. The scale used was 'Well Prepared', 'Somewhat Prepared', and 'Unprepared'. | **Direct Benchmarks**
The mean scores for UI Civil Engineering students on the ethics section of the exam should be within 10% of the ratio scores reported by NCEES for BSCE students at ABET Comparator Institutions over a five-year period.

**Indirect Benchmarks**
We would expect 90% of students to have rated their ability as "prepared" or "somewhat prepared". | **Direct Findings**
The following values represent the FE Exam score ratios of UI exam takers with those at ABET comparator institutions as reported by NCEES on "Ethics and Professional Practice portion of the the exam, where 1.00 represents identical mean scores between the two groups: Ethics = 1.01

**Indirect Findings**
Based on the exit survey results, 96% of graduating students reported that they understand their ethical and professional responsibilities, we conclude that this learning outcome is currently being met; however, we are planning to incorporate an ethics case study in our senior seminar course and formally assess it. | All CE majors are required to take an ethics course (PHIL 103). In addition, some faculty have incorporated ethics content into many of our core courses. Based on the FE Ethics score and the perception by our graduating seniors that they understand their ethical and professional responsibilities, we conclude that this learning outcome is currently being met; however, we are planning to incorporate an ethics case study in our senior seminar course and formally assess it. |
6. Prior to graduation, students will demonstrate an ability to communicate effectively.

**Aligns with University Learning Outcome(s):**
Communicate

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**Assessment Tools and Procedures**

**Direct Measure**
Students will write reports and give oral presentations in CE 494/Senior Design Project. The reports will be evaluated by the course instructor and, when possible, by the project sponsor. Oral presentations will be evaluated by the course instructor.

**Indirect Measure**
In a written exit survey, graduating seniors are asked to rate 'their ability to communicate to a wide range of audiences'. The scale used was 'Well Prepared', 'Somewhat Prepared', and 'Unprepared'.

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**Benchmarks**

**Direct Benchmarks**
The average score for the written reports in these classes will be 80% or higher.

**Indirect Benchmarks**
We expect 90% of students to respond 'well prepared' or 'somewhat prepared'.

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**Findings**

**Direct Findings**
The mean score for the written component of the design reports was 95%; the mean score for the oral presentations was 97%. The oral presentations were public at the Engineering EXPO. The instructor noted that informal audience feedback was overwhelmingly positive.

**Indirect Findings**
Based on exit survey results, almost 70% of our graduating senior report that they are able to communicate effectively with a range of audiences.

**Face-to-Face Findings**

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**Curricular and Co-Curricular Changes to be Made**

At this time, our students are meeting this outcome at a very high level of performance. We do not feel any action is necessary at this time.
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<td>7. Prior to graduation, students will demonstrate an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td><strong>Direct Measure</strong> Percent correct on the Computational section of the Fundamentals of Engineering (FE) Exam administered by the National Council of Engineering Examiners.</td>
<td><strong>Direct Benchmarks</strong> The five-year average score on these sections for University of Idaho Civil Engineering students should meet or exceed national averages.</td>
<td><strong>Direct Findings</strong> The ratio of the scores for U of Idaho students compared to Carnegie Research-Extensive universities for 2014 in the area of Computational Tools is 1.18. U of Idaho students perform much better than their peers on a national exam since the score ratio is greater than 1.</td>
<td>Student outcomes are strong and will be monitored as the new exam format becomes the norm. No actions are needed at this time.</td>
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**Alignment with University Learning Outcome(s):** Learn and Integrate

**Face-to-Face Measures**

**Indirect Measure**

**Indirect Benchmarks**

**Indirect Findings**
Close the Loop Questions

Discuss your progress on the actions identified in your Assessment plan for 2014-15.

There are no recommended changes or modifications based on the previous assessment cycle.

In what ways were the changes you made in 2014-15 effective in improving your program?

The new Department Chair (who arrived in August 2016) determined that the assessment process is lacking in several areas. AY 2015-16 was considered a ‘transition’ year to a new Outcome Champion assessment model that will be started in Fall 2016. Overall, she determined that the assessment is too ‘formulaic’ and could benefit from using rubrics to assist in assessment. As a consequence of this transition, the outcomes were reduced from 11 to 7 for 2015-16 and will be revised as ABET modifies its student outcomes in 2017. Using FE Exam results will continue for some outcomes.

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