

Program Plan and Findings: Four Column Layout



Program (CEAT) - CIVE - Civil Engineering (BSCV) - 047

Program Mission Statement: The School of Civil and Environmental Engineering educates civil and environmental engineers with knowledge and skills for life-long careers; conducts research and scholarly activities; and shares knowledge through outreach activities.

<i>Outcomes</i>	<i>Assessment Methods</i>	<i>Findings</i>	<i>Use of Findings (Actions)</i>
<p>Knowledge - Graduates of the program will have an ability to apply knowledge of mathematics, science, and engineering</p> <p>Outcome Status: Active</p> <p>Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019</p> <p>Start Date:</p> <p>Archived Date:</p> <p>Outcome Type: Knowledge</p> <p>Reason for Archival:</p>	<p>This student outcome is primarily assessed with the results of the FE exam and the success of the students in the professional school curriculum, as noted by faculty evaluation of student performance on various course activities, primarily the senior design/capstone course. Obviously this student outcome is integral to nearly every course in the required curriculum. Student success in these courses in itself is a strong indicator of achievement of this program outcome. A passing score in the Fundamental of Engineering can be considered an equally strong indicator, and one that is external and readily quantified. The goal is to have every graduate pass the FE exam upon graduation, with the caveat that some international students opt not to take the exam.</p> <p>* Learning Outcome Goal/Benchmark:</p> <p>Timeline for Assessment: Yearly</p> <p>Other Assessment Type:</p>	<p>Reporting Period: 2018 - 2019</p> <p>Conclusion: 3 - Meets Program Expectations (Proficient)</p> <p>The results from the Fundamentals of Engineering exam provide strong evidence that this outcome has been achieved. The overall passing rate for our students for the most recent period for which data is available was 67%, which is down somewhat from historical averages, but very close to the national average with comparable programs (69%). Within specific categories of the exam that address this outcome, results were even more positive. For example, for the Spring 2019 data set, in the subcategories of mathematics, computational tools, and statics, were above the national average. The same cohort was slightly below the national average (for peer programs) in dynamics, mechanics of materials, and structural analysis. Looking over the data for the past few years, no obvious trend is observed. (11/18/2019)</p> <p>Number of Students Assessed: 27</p> <p>Number of Successful Students: 18</p> <p>How were students selected to participate in the assessment of this outcome?: Self-selected. The Fundamentals of Engineering exam is usually taken by students in their last semester. All students are strongly encouraged to take the exam, and approximately 90% do so.</p> <p>What do the findings suggest about student achievement of this learning outcome?: These findings suggest that out graduates demonstrate an ability to apply knowledge of</p>	<p>Use of Findings (Actions): At this time, the primary action will be to monitor the student performance on the exam, wit improved guidance of students as they prepare. Based on anecdotal information from examinees, it was learned that some students select to take the exam once as a "practice" run, and then take it again with a more serious approach. Faculty will discourage this approach in the future. At this time, it is not believed that any curricular change is needed. (11/18/2019)</p>

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
<p>Effective Communication - Graduates of the program will have an ability to communicate effectively.</p> <p>Outcome Status: Active</p> <p>Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019</p> <p>Start Date:</p> <p>Archived Date:</p> <p>Outcome Type: Skills</p> <p>Reason for Archival:</p>	<p>This student outcome is interpreted to include written and oral communication, as well as the visual communication of technical concepts. The ability to communicate effectively is assessed in a number of ways. For example, the students' performance in courses that focus exclusively on communication (such as ENGL 3323 - Technical Writing and SPCH 2713 - Introduction to Speech) provide initial evidence of achievement of this program outcome. Furthermore, the survey of program alumni, as well as the evaluation of student performance in the communication aspects of the capstone courses, provides evidence of achieving this outcome. Lastly, faculty evaluation of key assignments or projects within the curriculum is used as a final, more direct assessment of achievement of this outcome. This includes a writing assignment in CIVE 4833 Unit Operations in Environmental Engineering, as well as in the evaluation in the capstone courses.</p> <p>* Learning Outcome Goal/Benchmark:</p> <p>Timeline for Assessment: Yearly</p> <p>Other Assessment Type:</p>	<p>math, science and engineering proficiently. These results are supported by other observations, of faculty and alumni. However, the fact that the FE passing rate is somewhat lower than it was a few years ago suggests that some corrective actions may be called for.</p> <p>Reporting Period: 2018 - 2019</p> <p>Conclusion: 2 - Meets Minimum Program Expectations (Developing)</p> <p>As noted, various methods are used to evaluate achievement of this outcome. Perhaps the best to focus on are those related to the senior design courses, which all students take in their final semester. Their written reports and their oral presentations give an opportunity for faculty and outside evaluators to assess the students' work. A faculty panel reviewed the teams' final reports and found them overall to be satisfactory in terms of their effective communication. However, there were some deficiencies noted. For example, some reports included sections that were poorly edited and demonstrated an unacceptable level of grammatical errors. A few others also exhibited a poor approach to graphical communication, presenting figures and drawings that were very difficult to read or understand. Despite these shortcomings, the reports were deemed acceptable overall.</p> <p>Regarding oral communication, students received mostly high ratings from the outside panel members who listened to their presentations and interviewed the design teams during their poster presentations. No specific shortcomings were identified and all reviewers rated the students as, at least acceptable, with many rated well above that. (11/18/2019)</p> <p>Number of Students Assessed: 41</p> <p>Number of Successful Students: 41</p> <p>How were students selected to participate in the assessment of this outcome?: All graduating students must take senior design (CIVE 4043 or 4143), and as such, all are included in the assessment.</p> <p>What do the findings suggest about student achievement of this learning outcome?: The findings suggest that our students are able to communicate effectively, though there</p>	<p>Use of Findings (Actions): It is recommended that the following actions be taken in the senior design courses:</p> <ol style="list-style-type: none"> 1) Encourage groups to proofread each other's writing before inclusion in the final report. Peer evaluation can be an effective learning tool for both students who write well and those with more room for improvement. 2) Spend more time discussing the features of effective graphical communication and provide examples of mistakes to avoid and examples of very effective graphics. Emphasize the value of good graphics in enhancing the overall report. <p>Curriculum-wide, it is also recommended that written communication in particular be enhanced or added wherever possible (and practical). Faculty have already discussed ways to provide more opportunities for students to better hone these skills. (11/18/2019)</p>

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
<p>Techniques - Graduates of the program will have an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</p> <p>Outcome Status: Active</p> <p>Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019</p> <p>Start Date:</p> <p>Archived Date:</p> <p>Outcome Type: Skills</p> <p>Reason for Archival:</p>	<p>This student outcome is assessed by both internal and external assessments. Externally, the Fundamentals of Engineering section that addresses computational tools is a useful quantitative indication of the students' achievement in this area. The metric goal here is for our students to perform at or above the national average (for the comparator group assigned) on this section of the exam. Internally, one performance indicator is taken from CIVE 3833 Applied Hydraulics. This course uses several software packages in addressing hydraulic problems. One assignment is selected from the course and student performance in using the software to solve the problem is then used as an indicator of the students' abilities with respect to this student outcome. Furthermore, because such tools are frequently used in the capstone courses, the students' performance in these courses also is used as an indication of achievement of this program outcome. Faculty evaluation of students' skills in this area, based on their performance on specific activities (performance indicators) in the capstone courses is applied here. Lastly, both graduating seniors and program alumni are asked how well</p>	<p>is clearly a range of the level of achievement. Areas for improvement include grammar and other writing skills (for specific individuals in need of remediation), as well as improved instruction on presentation of graphical information.</p> <p>Reporting Period: 2018 - 2019</p> <p>Conclusion: 3 - Meets Program Expectations (Proficient)</p> <p>Findings for this assessment will focus on two key assessment tools, the Fundamentals of Engineering (FE) exam as well as the faculty assessment resulting from the senior design courses (CIVE 4043 and 4143). With respect to the FE exam, in the last data set available (Jan - June 2019) our students performed only slightly below the national average (of peer programs) on the 'Computational Tools' section of the exam. While this exam section addresses only a portion of the skill encompassed by this outcome, it does serve as a good indicator of our students' level of proficiency in the use of these tools. Regarding the products of the senior design classes, most outside reviewers reported finding out students' use of modern engineering tools to be at least satisfactory and in some cases much better. The panel observed many examples of students exhibiting the application of skills, techniques, and modern computational tools. In general, a few opportunities for improvement were also identified, though the overall assessment was satisfactory. (11/18/2019)</p> <p>Number of Students Assessed: 41</p> <p>Number of Successful Students: 41</p> <p>How were students selected to participate in the assessment of this outcome?: For the FE, they are self-selected, though most students take the exam in their last semester. For the senior design courses, all graduating seniors take the course in their last semester and all have their reports evaluated.</p> <p>What do the findings suggest about student achievement of this learning outcome?: The findings suggest that, in general, our graduates exhibit the skills defined in this outcome. Some concern was expressed regarding the</p>	<p>Use of Findings (Actions): While no curricular action is required as a result of these findings, some actions are still being undertaken. Discussion of what software to include within the curriculum is ongoing, and is a question likely never to be definitively answered, as software available and in use in the profession is ever changing. Faculty are aware of the situation and seek to ensure that our students are prepared for professional practice. A review of what software is currently required across the curriculum is also underway. Within the senior design courses, efforts are also underway to ensure that all team members have a clear understanding of all components of the project, and they are encouraged to learn from each other regarding any specialized software used in their project. (11/18/2019)</p>

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	<p>prepared they feel to use new technology in practice.</p> <p>* Learning Outcome</p> <p>Goal/Benchmark:</p> <p>Timeline for Assessment: Yearly</p> <p>Other Assessment Type:</p>	<p>ability of all students, as opposed to a subset. that is, it can be difficult on group project reports, to be sure all students were involved or understand the work done by a given individual. Students acquire these skills not only through classwork, but on internships as well. Specific individuals may become very proficient in a given software package, for example. While this is clearly a desirable outcome for that student, it may result in his or her team relying heavily on that individual to perform the tasks requiring that software.</p> <p>The FE results suggest similar conclusions. Some of the actions outlined for Outcome 1 apply here as well.</p>	