School of Civil and Environmental Engineering / College of Engineering, Architecture, and Technology

Bachelor of Science in Civil Engineering

Assessment Plan Form

Date Plan was Approved by Department: 5/9/2017

Name of Person Submitting Plan: Norb Delatte

A. Program Information:

Assessment Coordinator's Name: Gregory G. Wilber

Assessment Coordinator's Email Address: gregory.wilber@okstate.edu

B. Program Mission Statement

In the box below, provide the mission statement for the program.

The mission statement, educational objectives, and goals for program should guide the assessment process. The mission statement should align with department, college, and institutional mission statements.

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.

C. Student Learning Outcomes

On the pages that follow, list the Student Learning Outcomes associated with the program identified in this assessment form.

Graduates of the program will have:

- an ability to apply knowledge of mathematics, science, and engineering,
- an ability to communicate effectively,
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, and
- an ability to analyze and solve problems in multiple technical areas of civil engineering.

C1) Student Learning Outcome #1: an ability to apply knowledge of mathematics, science, and engineering,

Identify opportunities for students to learn this outcome during the academic program:

For example, include a curriculum map that lists the courses or other learning experiences in which the student learning outcome is taught. Another example is a written narrative that describes how the learning outcome is integrated into the program.

This outcome is at the heart of any engineering education and, as such, there are opportunities for students to achieve this outcome throughout the curriculum. Nearly every course required outside of the general education curriculum involves the application of math, science and engineering principles. This outcome is also the first listed in the current Student Outcomes for ABET accreditation and is therefore central to the curriculum.

How will students be selected to participate in the assessment of this outcome?

All students are encouraged and incentivized to take and pass the Fundamentals of Engineering exam before they graduate. Currently, approximately 85% do. Data from student performance on the exam is compiled by NCEES twice each year and given to the program for use in assessment.

Additional assessments, such as the survey of faculty and the survey of employers, also assess the achievement of this outcome. The faculty survey involves all students in the program. The employer survey is designed to include as many program graduates as possible, but the actual number varies from year to year.

Assessment Methods

Identify the method(s) used to assess this learning outcome. Check all that apply.

☐Survey

☒Rating of skills (e.g., rubrics)

☐Analysis of written artifacts

☒Comprehensive, certification, or professional exam(s)

☐Oral presentation

☐Course project

☐Satisfaction Survey

☐Benchmarking

☐Measuring effectiveness relative to professional standards

☐Review of thesis/dissertation/ creative component

☐Capstone project

☐Internship

☐Interviews

☐Performance or jury

☐Visual collection (photos, videos, etc.)

☐Review of student research

☐Other (please specify):

Click here to specify.

Describe the how the assessment method will be implemented, administered, and/or conducted.

The primary assessment tool for this outcome is the Fundamental of Engineering exam, which is available to students throughout the year at the OSU testing Center and other testing centers. It is a 6-hour exam administered by the National Council for the Examination of Engineers and Surveyors (NCEES) and is a key step in the process for engineers to become licensed. All of our students are encouraged to prepare well and take the exam before graduation. They must register and schedule the exam themselves. Once they receive proof that they have passed the exam, they are eligible for a refund of some of the exam costs, a program supported by funds from the OSU Office of Assessment and Testing.

Does your department/program faculty have a goal set for this learning outcome? ☒Yes ☐No

For example, "80% of students included in the assessment will receive a 4 on the rubric" or "80% of students included in the assessment will achieve a passing score on the certification exam." If yes, please describe the goal below.

It is an aspirational goal that 100% of our students have passed the exam before graduation. This is an aspirational goal, as there are always a few students who put off taking the exam before graduating and a few international students who intend to return to their home countries and therefore choose not to take the exam.

The second goal for this assessment uses the scores from the FE results, which the School receives twice a year, including compiled data for the first and second halves of each calendar year. The goal is that our students will perform at or above the national average (which is included in each data set received from NCEES) in each of the categories relevant to this outcome.

With respect to the faculty and employer surveys, the goal is for all students to be deemed as at least 'meeting expectations' for all questions directly related to this outcome.

Timeline for Planned Assessment

Indicate the timeline for the assessment of this learning outcome. While outcomes assessment must be conducted every year, not all student learning outcomes for a given program must be assessed every year. If the assessment of a particular learning outcome occurs on cycle or rotation, please describe and provide the rationale for the cycle/rotation below.

☐Each Semester ☒Yearly ☐Every other year

☐Other (please specify): If the assessment of Learning Outcome 1 occurs on a cycle or rotation, click here to describe and provide the rationale.

C2) Student Learning Outcome #2: an ability to communicate effectively

Identify opportunities for students to learn this outcome during the academic program:

For example, include a curriculum map that lists the courses or other learning experiences in which the student learning outcome is taught. Another example is a written narrative that describes how the learning outcome is integrated into the program.

This outcome is addressed at numerous points throughout the curriculum, beginning with freshman composition classes as well as speech (SPCH 1273). In upper level CIVE courses, written, oral, and graphical communication are required in numerous classes. Students are provided feedback on their writing and their presentations, giving them an opportunity ti improve these skills.

How will students be selected to participate in the assessment of this outcome?

All students are included in the faculty survey. Many students are included in the Employer Survey, though the number varies depending upon the response rate from employers. Other more ad-hoc assessments occur in individual classes and these will look at a small sub-set of students.

Assessment Methods

Identify the method(s) used to assess this learning outcome. Check all that apply.

☒Survey

☐Rating of skills (e.g., rubrics)

☐Analysis of written artifacts

☐Comprehensive, certification, or professional exam(s)

☐Oral presentation

☐Course project

☐Satisfaction Survey

☐Benchmarking

☐Measuring effectiveness relative to professional standards

☐Review of thesis/dissertation/ creative component

☐Capstone project

☐Internship

☐Interviews

☐Performance or jury

☐Visual collection (photos, videos, etc.)

☐Review of student research

☐Other (please specify):

Click here to specify.

Describe the how the assessment method will be implemented, administered, and/or conducted.

Faculty are annually asked about students' abilities in oral, written, and graphical communication. The faculty, particularly those teaching the capstone courses, are in the best position to assess how well students are able to communicate the results of their work.

The Employer Survey is conducted on a four-year cycle. Several questions inquire about the employers' perceptions of our graduates' abilities in these areas.

Does your department/program faculty have a goal set for this learning outcome? ☒Yes ☐No

For example, "80% of students included in the assessment will receive a 4 on the rubric" or "80% of students included in the assessment will achieve a passing score on the certification exam." If yes, please describe the goal below.

The aspirational goal is for every graduate to at least meet expectations of both faculty and employers with respect to their communication abilities. If responses fall below at least 80% of graduates meeting expectations in this area, a response will be initiated.

Timeline for Planned Assessment

Indicate the timeline for the assessment of this learning outcome. While outcomes assessment must be conducted every year, not all student learning outcomes for a given program must be assessed every year. If the assessment of a particular learning outcome occurs on cycle or rotation, please describe and provide the rationale for the cycle/rotation below.

☐Each Semester ☐Yearly ☐Every other year

☐Other (please specify): If the assessment of Learning Outcome 2 occurs on a cycle or rotation, click here to describe and provide the rationale.

C3) Student Learning Outcome #3: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Identify opportunities for students to learn this outcome during the academic program:
For example, include a curriculum map that lists the courses or other learning experiences in which the student learning outcome is taught. Another example is a written narrative that describes how the learning outcome is integrated into the program.
This outcome also appears throughout the curriculum. In the pre-professional portion of the curriculum, students learn programming, spread-sheet applications, and computer-aided design, and they begin to apply those skills in courses. In the professional school courses, students have numerous opportunities to apply and improve those skills.

How will students be selected to participate in the assessment of this outcome?

All students are encouraged and incentivized to take and pass the Fundamentals of Engineering exam before they graduate. Currently, approximately 85% do. Data from student performance on the exam is compiled by NCEES twice each year and given to the program for use in assessment.

Additional assessments, such as the survey of faculty and the survey of employers, also assess the achievement of this outcome. The faculty survey involves all students in the program. The employer survey is designed to include as many program graduates as possible, but the actual number varies from year to year.

Assessment Methods
Identify the method(s) used to assess this learning outcome. Check all that apply.

☒Survey

☐Rating of skills (e.g., rubrics)

☐Analysis of written artifacts

☒Comprehensive, certification, or professional exam(s)

☐Oral presentation

☐Course project

☐Satisfaction Survey

☐Benchmarking

☐Measuring effectiveness relative to professional standards

☐Review of thesis/dissertation/ creative component

☐Capstone project

☐Internship

☐Interviews

☐Performance or jury

☐Visual collection (photos, videos, etc.)

☐Review of student research

☐Other (please specify):

Click here to specify.

Describe the how the assessment method will be implemented, administered, and/or conducted.
The primary assessment tool for this outcome is the Fundamental of Engineering exam, described above. The exam has one particular section 'Computational Tools' which directly address these abilities.
In addition, faculty and employer surveys can provide additional assessment of these skills.

Does your department/program faculty have a goal set for this learning outcome? ☐Yes ☐No
For example, "80% of students included in the assessment will receive a 4 on the rubric" or "80% of students included in the assessment will achieve a passing score on the certification exam." If yes, please describe the goal below.
With regard to results from the FE exam, it is desired that the average score for our students be at or above the national average on the 'Computational Tools' section of the exam. In addition, it is desired that all students are described as meeting expectations with regards to these skills by both employers and faculty. Faculty teaching the capstone classes are particularly well suited to observe student performance in this area.

Timeline for Planned Assessment

Indicate the timeline for the assessment of this learning outcome. While outcomes assessment must be conducted every year, not all student learning outcomes for a given program must be assessed every year. If the assessment of a particular learning outcome occurs on cycle or rotation, please describe and provide the rationale for the cycle/rotation below.

☐Each Semester ☒Yearly ☐Every other year

☐Other (please specify): If the assessment of Learning Outcome 3 occurs on a cycle or rotation, click here to describe and provide the rationale.

C4) Student Learning Outcome #4 : an ability to analyze and solve problems in multiple technical areas of civil engineering

Identify opportunities for students to learn this outcome during the academic program:
For example, include a curriculum map that lists the courses or other learning experiences in which the student learning outcome is taught. Another example is a written narrative that describes how the learning outcome is integrated into the program.
Students take course in several areas of civil engineering in their professional school curriculum. In all of these courses, they analyze and solve problems related to the technical area addressed in that course. The capstone design courses generally require them to integrate problem-solving skills from more than one of these technical areas.

How will students be selected to participate in the assessment of this outcome?

All students are encouraged and incentivized to take and pass the Fundamentals of Engineering exam before they graduate. Currently, approximately 85% do. Data from student performance on the exam is compiled by NCEES twice each year and given to the program for use in assessment.

Additional assessments, such as the survey of faculty and the survey of employers, also assess the achievement of this outcome. The faculty survey involves all students in the program. The employer survey is designed to include as many program graduates as possible, but the actual number varies from year to year.

Assessment Methods
Identify the method(s) used to assess this learning outcome. Check all that apply.

☒Survey

☐Rating of skills (e.g., rubrics)

☐Analysis of written artifacts

☒Comprehensive, certification, or professional exam(s)

☐Oral presentation

☐Course project

☐Satisfaction Survey

☐Benchmarking

☐Measuring effectiveness relative to professional standards

☐Review of thesis/dissertation/ creative component

☐Capstone project

☐Internship

☐Interviews

☐Performance or jury

☐Visual collection (photos, videos, etc.)

☐Review of student research

☐Other (please specify):

Click here to specify.

Describe the how the assessment method will be implemented, administered, and/or conducted.
The primary assessment tool for this outcome is the Fundamental of Engineering exam, described above. Sub-scores are presented in the following areas: hydraulics and hydrologic systems, structural analysis, structural design. geotechnical engineering, transportation engineering, environmental engineering, construction, and surveying. Performance of our students (those that took the exam in a given 6-month period) are compared to a national average from peer institutions.
Additional questions addressing the breadth and depth of our students' abilities in the various technical areas are asked in the employer survey. Responses from this provide additional insight into how well our students are achieving this outcome.

Does your department/program faculty have a goal set for this learning outcome? ☒Yes ☐No
For example, "80% of students included in the assessment will receive a 4 on the rubric" or "80% of students included in the assessment will achieve a passing score on the certification exam." If yes, please describe the goal below.
The aspirational goal for this outcome is for each group (i.e. the set of students who took the exam in a given 6-month period) to be at or above the national average for that time period for each of the sub-score areas. If student performance falls below that value more than once in a row, in any given area, the faculty will be notified and an appropriate response can be discussed.
It is also a goal that all employers express that our graduates at least meet their expectations with regard to their problem-solving skills in the relevant technical areas.

Timeline for Planned Assessment

Indicate the timeline for the assessment of this learning outcome. While outcomes assessment must be conducted every year, not all student learning outcomes for a given program must be assessed every year. If the assessment of a particular learning outcome occurs on cycle or rotation, please describe and provide the rationale for the cycle/rotation below.

☐Each Semester ☒Yearly ☐Every other year

☐Other (please specify): If the assessment of Learning Outcome 4 occurs on a cycle or rotation, click here to describe and provide the rationale.