**Major Assessment Report**

**Bachelor of Science in Civil Engineering (BSCE) – Civil Engineering Program**

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**Background:** The BSCE Program at CSU Fresno is an accredited program by the Accreditation Board for Engineering and Technology (ABET), since 1968. The current (Fall 2017) enrollment of the BSCE program is about 450. Sixty-eight (68) BSCE degrees were awarded in AY2016-17.

The Program’s Educations Objectives (EOs), which describe the career and professional accomplishments that the Program is preparing graduates to achieve, include:

1. **Technical Aptitude**: Be employed as engineers with the ability to use their technical knowledge, design, and problem solving skills for effective professional practice throughout their careers;
2. **Life-Long Development**: Exercise capabilities for life-long learning as a mean to enhance their technical and professional skills, to continuously enrich themselves and benefit the communities they are serving and beyond,
3. **Collaborative Spirit**: Develop interpersonal and collaborative skills that function well amongst a diverse group of professionals for a productive career; and
4. **Professional Advancement**: Advance and support the engineering profession through participation of professional societies, civic groups, and educational institutions; and/or establish a distinctive record of professional achievements.

The Program’s Student Outcomes (SOs), which are skill sets students are expected to gain and capabilities students should possess by the time of graduation, are those identified by ABET and include:

(a) An ability to apply knowledge of mathematics, science, and engineering.

(b) An ability to design and conduct experiments, as well as to analyze and interpret data.

(c) An ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

(d) An ability to function on multidisciplinary teams.

(e) An ability to identify, formulate, and solve engineering problems.

(f) An understanding of professional and ethical responsibility.

(g) An ability to communicate effectively.

(h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

(i) A recognition of the need for, and an ability to engage in, life‐long learning.

(j) A knowledge of contemporary issues.

(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

See Table 1 (back page) for the mapping of Program’s SOs to its EOs.

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| --- | --- | --- | --- | --- |
| 1. **What learning outcome(s) did you assess this year?** List all program outcomes you assessed (if you assessed an outcome not listed on your department SOAP please indicate explain). Do not describe the measures or benchmarks in this section. Also please only describe major assessment activities in this report. The G.E. Committee will issue a separate call for G.E. assessment reports.

Two key learning or student outcomes (out of eleven) were the focus of the direct assessment using embedded-question approach (i.e., body-of-knowledge assessment). The two primary student outcomes are: SO (a) and SO (e), and they are as follows:

|  |  |
| --- | --- |
| (a) | An ability to apply knowledge of mathematics, science, and engineering |
| (e) | An ability to identify, formulate, and solve engineering (design) problems |

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| 1. **What instruments (assignment) did you use to assess them?** If the assignment (activity, survey, etc.) does not correspond to the activities indicated in the timeline on the SOAP, please indicate why. Please clearly indicate how the instrument (assignment) is able to measure the outcome. If after evaluating the assessment you concluded that the measure was not clearly aligned or did not adequately measure the outcome please discuss this in your report. Please include the benchmark or standard for student performance in your assessment report (if it is stated in your SOAP then this information can just be copied into the report). An example of an expectation or standard would be “On outcome 2.3

The direct assessment used to measure the said outcomes (see Question 1) is embedded-question assessment (i.e., body-of-knowledge assessment).In Fall 2016 semester, two core / required courses of BSCE were involved in this process: CE130 – Theory of Structures, and CE132 – Reinforced Concrete Design. It should be noted that CE130 is a pre-requisite for CE132; therefore, CE132 should allow the students to strengthen the specific skill sets (i.e., SOs) further.For CE130, Fall 2016: The embedded question (Problem 1, Final Exam) involved analysis of a statically determinate truss, in which students were expected to apply Virtual Work Method to solve deflections of the problem. The problem required students to formulate and solve the said problem by integrating principles of engineering (Virtual Work Method), science (Statics Equilibrium), and mathematics (Algebra). By estimation, students were expected to spend about 30 to 45 min, out of the 2 hours allocated for the Final exam, on the problem.For CE132, Fall 2016:The embedded questions [Parts (a) and (b) of Problem 1, Final Exam) involved analysis of a reinforced concrete column. The students were to demonstrate their understanding and application of working knowledge of ACI318-14 (Design Specification for Reinforced Concrete) in the evaluation, which would highlight their ability to formulate and solve engineering problem [SO (e)] by integrating state-of-art knowledge (i.e., current practice and engineering principles for Concrete Design), science, and mathematics [SO (s)]. |
| 1. **What did you discover from the data?** Discuss the student performance in relation to your standards or expectations. Be sure to clearly indicate how many students did (or did not) meet the standard for each outcome measured. Where possible, indicate the relative strengths and weaknesses in student performance on the outcome(s).

For CE130, Fall 2016:Size (students taking Final) = 35Target Performance = scored at least 6 out of 10 points, Problem 1, Final Exam of CE130Expectation = At least 65% of students or 22 students, should achieve target performance to be deemed satisfactory of attainment of measured SOs**Results for CE130: 21 students or 60% of the class achieved target performance. The result shows that almost as many students performed satisfactory as expected by the instructor in the historically difficult class.**For CE132, Fall 2016:Size (students taking Final) = 37Target Performance = scored at least 5 out of 8 points, Parts (a) and (b), Problem 1, Final Exam of CE132Expectation = At least 65% of students or 24 students, should achieve target performance to be deemed satisfactory of attainment of measured SOs**Results for CE132: 24 students or 70% of the class achieved target performance. The result shows that the number students performed satisfactory exceeds the instructor’s expectation.** |
| 1. **What changes did you make as a result of the data?** Describe how the information from the assessment activity was reviewed and what action was taken based on the analysis of the assessment data.

The finding in both CE130 and CE132 would suggest current mode of delivery is satisfactory in which students’ performance was on par with general expectation. |
| 1. **What assessment activities will you be conducting in the 2016-2017 AY?** List the outcomes and measures or assessment activities you will use to evaluate them. These activities should be the same as those indicated on your current SOAP timeline; if they are not please explain.

The key assessment activity in AY2017-18 will be an indirect one, Student Course Survey, which will be carried out in Spring 2018.Exit interviews of graduating seniors gauging satisfactory responses of Program & University will also be conducted per usual. |
| 1. **What progress have you made on items from your last program review action plan?** Please provide a brief description of progress made on each item listed in the action plan. If no progress has been made on an action item, simply state “no progress.”

There was no action item from AY2015-16 program review.**Additional Guidelines:** If you have not fully described the assignment then please attach a copy of the questions or assignment guidelines. If you are using a rubric and did not fully describe this rubric (or the criteria being used) than please attach a copy of the rubric. If you administered a survey please attach a copy of the survey so that the Learning Assessment Team (LAT) can review the questions. |

**Table 1. Mapping of SOs to Program’s EOs**

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| --- | --- |
| **Student Outcomes** | **Program Educational Objectives** |
| Technical Aptitude | Life-Long Development | Collaborative Spirit | Professional Advancement |
| (a) An ability to apply knowledge of mathematics, science, and engineering. | **●** |  |  |  |
| (b) An ability to design and conduct experiments, as well as to analyze and interpret data. | **●** |  |  |  |
| (c) An ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability | **●** |  |  | **●** |
| (d) An ability to function on multidisciplinary teams. |  |  | **●** |  |
| (e) An ability to identify, formulate, and solve engineering problems. | **●** | **●** |  | **●** |
| (f) An understanding of professional and ethical responsibility. |  |  |  | **●** |
| (g) An ability to communicate effectively. |  | **●** | **●** | **●** |
| (h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. |  | **●** |  | **●** |
| (i) A recognition of the need for, and an ability to engage in, life‐long learning. |  | **●** |  |  |
| (j) A knowledge of contemporary issues. |  | **●** |  |  |
| (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. | **●** |  |  |  |