Program Improvement Plan
Bachelor of Science in Civil Engineering

Department of Civil Engineering
College of Engineering, Computer Science, and Construction Management
California State University, Chico

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Third Edition
May 2015
**Note:** This document describes the Civil Engineering *Program Improvement Plan (PIP).* Summaries of findings and actions resulting from implementation of the *PIP* are provided in the companion documents, *Program Improvement Report (PIR).*

The *PIP* is updated periodically, but only when justified by significant changes to any part of the plan.

The *PIRs* are compiled on an academic year cycle and are based on the *PIP* in effect at the time of the report. Minor deviations from the applicable plan are called out in each report.

**History of Modifications to the Program Improvement Plan:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 2009</td>
<td>Comprehensive revision of the plan (2nd Edition). This version was not</td>
</tr>
<tr>
<td></td>
<td>implemented until it was subsequently updated in May 2015.</td>
</tr>
</tbody>
</table>

The current edition of the *PIP* and all editions of the *PIR* are archived at: [http://www.csuchico.edu/ce/menu_about/menu_program_assessment.shtml](http://www.csuchico.edu/ce/menu_about/menu_program_assessment.shtml)
# Program Improvement Plan
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Introduction

The Civil Engineering Department has, for many years, incorporated multiple means of programmatic assessment. These include graduating senior surveys, alumni surveys, employer surveys, the pass-rate on the Fundamentals of Engineering examination, input from the Civil Engineering Professional Advisory Board, critical evaluations by the Engineering Accreditation Commission of ABET, and instructor self-assessment of courses. Although these past practices have been invaluable to the BSCE program, development and refinement of assessment strategies are ongoing.

Since Fall 2003, the department has employed a comprehensive plan for direct assessment of all identified student learning outcomes within the academic program. This undertaking provides program assessment through direct measures of student achievement, as collected and evaluated within student assignments embedded in selected required courses in the CE curriculum.

I. Program Student Learning Outcomes

1. Program Student Learning Outcomes

The Department of Civil Engineering has adopted for the BSCE degree program outcomes consistent with those specified by ABET. Program outcomes are narrow statements that describe what students are expected to know and be able to do by the time of graduation. The program outcomes derive from the program’s mission and educational objectives (see Section II).

Students completing the civil engineering program at CSU, Chico must demonstrate:

- an ability to apply knowledge of mathematics, science, and engineering, including:
  - mathematics through differential equations,
  - calculus-based physics,
  - chemistry,
  - biology, and
  - four technical areas appropriate to civil engineering;
- an ability to design and conduct civil engineering experiments, as well as to analyze and interpret the resulting data;
- an ability to design a system, component, or process to meet desired needs in more than one civil engineering context and within realistic constraints;
- an ability to function on multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an understanding of professional and ethical responsibility, including the importance of professional licensure;
- an ability to communicate effectively;
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- a recognition of the need for, and an ability to engage in life-long learning;
- a knowledge of contemporary issues;
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice; and
- an understanding of basic concepts in management, business, public policy, and leadership.
2. Distribution of Learning Outcomes Throughout the Curriculum

The Civil Engineering curriculum is comprised of a minimum of 128 units of general education, mathematics, sciences, and engineering courses. The program is hierarchical in structure, a feature typical of engineering programs. Consequently, most courses are specified by the faculty rather than selected by the student and prerequisite chains are common (Table I.2.1).

The identified learning outcomes (a through l) are distributed throughout the program so as to provide a gradual increase in student proficiency (Table I.2.2). Concepts are generally introduced in basic courses and then practiced in more advanced courses. In some courses where concepts are practiced, students are also assessed in order to measure their proficiency in selected program outcomes.

Each program outcome is addressed in multiple courses through a progressive distribution of content across the major. For example, outcome c: an ability to design a system, component, or process to meet desired needs in more than one civil engineering context and within realistic constraints is introduced, within different contexts, in three courses, is practiced in at least six courses, and is directly assessed in two courses – CIVL 461 Water Resource Engineering and CIVL 5##C Capstone Design Selection.

The courses selected for assessment of student learning outcomes all provide significant treatment of the target outcome, do so in a manner that can be assessed, and complement each other when more than one course is identified for a single outcome (rather than just providing redundancy). Assessment is generally undertaken at the upper-division level so as to measure student achievement of a particular awareness, skill, or ability at a relatively advanced level.

3. Direct and Embedded Assessment

The direct assessment process as developed by the CIVL department is a valuable component of our portfolio of assessment measures. Changes to the process are continuous; if nothing more than to reflect differing pedagogy when instructional assignments change. One key feature of the CIVL assessment plan is that it is “embedded” as a natural feature in each related course – so the assessment metric must be tied not just to the course but to the individual instructor, as well.

A detailed description of the assessment plan is provided in Appendix A: Direct Assessment Measures. The assessment plan addresses program assessment through direct measures of student achievement. The assessment results are used to focus on possible weaknesses in and suggested enhancements to the civil engineering program. For example, if the assessment results for ABET outcome c: ability to design a system, component or process to meet desired needs as measured in CIVL 461 Water Resource Engineering consistently fall short of the specified standard, then the department will consider increased or enhanced treatment of this topic. These programmatic improvements might be incorporated in the assessed course, CIVL 461 in this example, but attention might just as well focus on a preceding required course containing this same learning outcome, e.g., a perceived weakness in this outcome as assessed in CIVL 461 might be addressed by enhancements to CIVL 321 Fluid Mechanics, a course preceding CIVL 461 which contributes to this same learning outcome.
TABLE I.2.1 COURSE SEQUENCE IN THE CIVIL ENGINEERING CURRICULUM

Bachelor of Science in Civil Engineering

Major Academic Flowchart

University Catalog 2014-2015

Fall Semester (15 units)
- GE Area A2: Written Communication
- CIVL 101: Introduction to Civil Engineering
- MATH 120: Analytic Geometry and Calculus I
- PHYS 204A: Mechanics

Freshman Year

Spring Semester (17 units)
- HIST 130: U.S. History
- CIVL 175: Biological Processes in Environmental Engineering
- MATH Effective: MATH 220, 235 or 236
- CHEM 111: General Chemistry

Sophomore Year

Fall Semester (16-17 units)
- GE Area A1: Oral Communication
- CIVL 211: Statics
- MATH 211: Elementary Differential Equations
- PHYS 204B: Electricity and Magnetism

Spring Semester (16-17 units)
- GE Area C*: Arts and Humanities
- CIVL 311: Strength of Materials
- MATH 260: Scientific Electives
- POLS 155: American Government

Junior Year

Fall Semester (17 units)
- GE Area D*: Behavioral and Social Sciences
- CIVL 313: Structural Analysis
- MECH 332: Thermodynamics
- ENGR Elective: Select 3 units from list of approved courses

Spring Semester (14-15 units)
- Free Elective
- CIVL 411: Soil Mechanics and Foundations
- CIVL 431: Environmental Engineering
- MECH Elective: Select 3 units from list of approved courses

Senior Year

Fall Semester (17 units)
- GE UD Pathway: Area C: One list of courses
- CIVL 415: Reinforced Concrete Design
- CIVL 441: Transportation Engineering
- MECH 320: Dynamics

Spring Semester (15-16 units)
- GE UD Pathway: Area D: See list of courses
- CIVL 495: Professional Issues in Engineering
- CIVL 565: Geotechnical Design Project
- Engr. Elective: Select 3 units from list of approved courses

*Select from GE courses that are also classified as Writing Intensive (2 courses), U.S. Diversity (1 course), and Global Cultures (1 course).
### TABLE I.2.2 DISTRIBUTION OF LEARNING OUTCOMES IN THE MAJOR

<table>
<thead>
<tr>
<th>Course</th>
<th>Sem. Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 120</td>
<td>4</td>
</tr>
<tr>
<td>MATH 121</td>
<td>4</td>
</tr>
<tr>
<td>MATH selection</td>
<td>3 or 4</td>
</tr>
<tr>
<td>MATH 260</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 204A</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 204B</td>
<td>4</td>
</tr>
<tr>
<td>Science selection</td>
<td>3 or 4</td>
</tr>
<tr>
<td>MECH 310</td>
<td>3</td>
</tr>
<tr>
<td>MECH 320</td>
<td>3</td>
</tr>
<tr>
<td>MECH 322</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 101</td>
<td>1</td>
</tr>
<tr>
<td>CIVL 140</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 145</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 175</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 205</td>
<td>2</td>
</tr>
<tr>
<td>CIVL 311</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 302</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 311</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 313</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 321</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 411</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 415</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 441</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 441</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 451</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 495</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 548C</td>
<td>3</td>
</tr>
</tbody>
</table>

### MAJOR REQUIRED COURSES, 85-99 UNITS

- **General Education, 21 UNITS**
  - CIVL 120: Introduction to Civil Engineering
  - CIVL 140: Statics
  - CIVL 145: Dynamics
  - CIVL 175: Engineering Mechanics
  - CIVL 205: Computer Applications
  - CIVL 311: Statics
  - CIVL 302: Engineering Risk and Economy
  - CIVL 311: Strength of Materials
  - CIVL 313: Stress Analysis
  - CIVL 321: Fluid Mechanics
  - CIVL 411: Soil and Foundations
  - CIVL 415: Reinforced Concrete
  - CIVL 441: Structural Analysis
  - CIVL 451: Environmental Engineering
  - CIVL 495: Research Project
  - CIVL 548C: Capstone Design Selection

### MAJOR SELECTED ELECTIVE COURSES, 8+ UNITS

- **Engineering Selected Elective Courses, 5-6 UNITS**
  - CIVL 551: Geotechnical Engineering
  - CIVL 554: Bridge Design
  - CIVL 556: Timber Design
  - CIVL 558: Civil Engineering
  - CIVL 562: Civil Engineering
  - CIVL 567: Pipe Hydraulics
  - CIVL 571: Natural Hazards Engineering
  - CIVL 582: Energy Principles
  - CIVL 583: Geotechnical Engineering
  - CIVL 592: Earthquake Engineering
  - Any 400/500 MECH course

- **Any 400/500 MECH course**
  - Learning outcomes vary depending on course selected.

### Technical Selected Elective Course, 6+ UNITS

- Select from department approved list

- Learning outcomes vary depending on course selected.

The metric chosen as the assessment measure in each course varies by course: from a score on a particular assignment, to an aggregate score on multiple assignments, to an overall course grade. In all cases, the metric is a natural component of the course rather than an artificial element interjected solely for assessment purposes. Consequently, the metric is an integrated component of teaching and learning (i.e., *embedded* assessment). Furthermore, the applicable metric is, in all cases, comprised primarily of the learning outcome for which the metric is intended. This
ensures that a student will only be able to meet the specified standard score if they have achieved proficiency in the targeted learning outcome.

4. Collection of Embedded Assessment Data

At the beginning of each semester, instructors of courses having proposed modifications to assessment practices submit the modifications for review by the assessment coordinator and, ultimately, by the entire faculty. The purpose of this review is to verify that the assessment criteria are adequately defined and distributed for assessment of student success at attaining the specified outcome(s).

Near the end of each semester, an evaluation template is provided to each instructor for courses in which students are assessed (Appendix B: Sample Assessment Summary – Data Collection). Keeping with the essential requirement that the assessment process must be useful, manageable, and sustainable, the template is designed to provide a clear and complete assessment summary while minimizing additional workload for the instructor.

The template was designed to incorporate and summarize all of the different metrics identified for assessment by assessed course. To use the template, each instructor simply enters the number of students who have achieved the standard (i.e., the achievement level representing minimally acceptable proficiency) associated with the learning outcome, and the number of students who have not achieved the standard. The template then automatically determines whether the results indicate acceptable or unacceptable overall achievement of the programmatic goal for the specified learning outcome (e.g., at least 90% of CE majors will meet the standard). Instructors are also prompted to make optional notes about the assessment experience in that particular course, including suggestions for possible changes to the assessment process. Following submission of individual course results, the assessment coordinator compiles an overall summary of that semester’s assessment.

5. Other Direct Measures of Assessment

Several other methods of assessment have been employed in order to provide additional, supplemental information regarding program effectiveness. While most of these methods are indirect measures, one direct measure, student performance on the Fundamentals of Engineering (FE) examination, has been used with mixed results.

The National Council of Examiners for Engineering and Surveying (NCEES) provides summary data, by university and major, for all students who are first-time examinees. The data consist of the number of students taking and passing the examination (also reported as a percentage pass rate). The mean pass rate is also presented for all ABET-accredited universities. Consequently, a comparison between the pass rates for Chico CIVL majors as compared to national norms would, seemingly, provide valuable reflection on program performance.

However, several factors limit the value of this information, the most significant being that students frequently sit for the examination prior to completing all of the subject matter coursework on which they will be tested. They are, in fact, encouraged by the program faculty to take the exam early in order to improve their chances of passing the test prior to graduation.
These early test-takers likely have a relatively high failure rate, although they may ultimately pass the exam in a subsequent attempt.

A pass rate based on a student’s final attempt, that is after all prerequisite coursework has been completed, would be a valuable direct measure of overall program effectiveness. However, the NCEES does not attempt to make this distinction. Consequently, the reported pass rate for CIVL majors at Chico State will suffer a degree of bias towards the low end, due to the small number of students taking the test and the variable number of students who might be taking the exam early.

As a possibly more representative enhancement, the CIVL department is collecting, via the senior survey (see Section I.6), the number of students who have taken and who have passed the FE examination by the time of graduation. While students have, for some time, been prompted on this survey to report this information, the return rate on the survey has not been consistently sufficient to ensure valid results. A concerted effort is needed to improve the return rate and to gather this potentially very useful assessment information, particularly now that the survey is administered online.

6. Indirect Measures of Assessment

The CIVL department generally employs two indirect measures of student assessment. The most significant is the graduating senior survey (Appendix C), which consists of two parts: a portion common to all majors in the College of Engineering, Computer Science, and Construction Management, plus a smaller, major-specific portion. The college portion, due to its greater complexity, is not significantly changed from semester to semester. The CIVL portion, being shorter and simpler, is easily changed to gather a variety of different information at different times, although this has not been the practice in recent years. The graduating senior survey was first initiated in 1995, the current college portion of the survey dates from 2002, and the current version of the major-specific survey will be implemented in the 2015-2016 academic year.

A significant portion of the graduating senior survey consists of questions designed to gauge student satisfaction with various aspects of their curricular, co-curricular, and extra-curricular experiences. A five-point Lichert scale is used, having “worst” to “best” responses as “1” to “5” in numerical choices, respectively. The CE program has set “3.50” as a desirable minimum mean response – i.e., a score below 3.50 will trigger in depth evaluation as to probable causes and, if appropriate, consideration of potential remedies.
II. Program Mission and Educational Objectives

1. Program Mission and Educational Objectives

The civil engineering program mission and educational objectives are reviewed periodically and updated as necessary, based upon input from the Civil Engineering Professional Advisory Board and subsequent reflection by the CIVL faculty. The current statement contained in the 2015-2016 University Catalog is as follows.

**Civil Engineering Program Mission**
The civil engineering program prepares graduates for immediate entry into a variety of professional careers and provides a solid undergraduate foundation in general principles enabling continued education at advanced levels.

**Civil Engineering Program Educational Objectives**
Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.
1. Civil engineering graduates will be prepared to be effective engineers and problem solvers.
2. They will be well educated in engineering sciences and proficient in at least four recognized civil engineering areas.
3. They will be able to appropriately utilize a variety of engineering tools and techniques to enhance their professional abilities.
4. They will be familiar with applicable regulatory and professional issues.
5. They will be effective technical written and oral communicators.
6. They will be able to function effectively as members of multi-disciplinary teams.
7. They will have an appreciation for the individual, society, good citizenship, community service, and ethical conduct, and they will be aware of the impact of their designs on humankind and the environment.

The program’s educational objectives and student learning outcomes are symbiotic – i.e., the learning outcomes identified by the program support the achievement of the educational objectives while the learning outcomes derive from the educational objectives (see Table II.1.1).

2. Alumni Survey

Civil engineering alumni have been surveyed regularly – most recently on a six-year cycle. This methodology provides a comprehensive sampling of graduates that is synchronized with the six-year accreditation review cycle. The most recent survey is illustrated in Appendix D and was first utilized in Spring 2015.

The alumni survey is administered in such a way as to gather information correlated by the time duration subsequent to degree. Consequently, the responses from recent graduates will be viewed separately – from alumni transitioning from entry-level positions, to more responsible positions, to senior positions.
3. Employer Survey

Known employers of Chico State CIVL graduates have been regularly surveyed. The most recent survey is illustrated in Appendix E and was first utilized in Spring 2015. The survey is administered every six years so as to coincide with the accreditation review cycle. The content of this survey instrument is designed to complement the information solicited by the alumni survey. In 2009, the department temporarily moved to an on-line survey with the expectation that all future surveys, alumni and employer, would be administered on-line. Despite use of a postcard mailer to inform employers of this opportunity to help with the assessment of the program, the response rate was abysmal. Consequently, paper survey instruments are currently used for both the alumni and employer surveys.

**TABLE II.1.1 MAPPING OF LEARNING OUTCOMES TO EDUCATIONAL OBJECTIVES**

<table>
<thead>
<tr>
<th>B. S. in Civil Engineering</th>
<th>Learning Outcomes: Students completing the civil engineering program must demonstrate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational Objectives: Civil engineering graduates will:</td>
<td></td>
</tr>
<tr>
<td>• be prepared to be effective engineers and problem solvers.</td>
<td></td>
</tr>
<tr>
<td>• be well educated in engineering sciences and proficient in at least four recognized civil engineering areas.</td>
<td></td>
</tr>
<tr>
<td>• be able to appropriately utilize a variety of engineering tools and techniques to enhance their professional abilities.</td>
<td></td>
</tr>
<tr>
<td>• be familiar with applicable regulatory and professional issues.</td>
<td></td>
</tr>
<tr>
<td>• be effective technical written and oral communicators.</td>
<td></td>
</tr>
<tr>
<td>• be able to function effectively as members of multidisciplinary teams.</td>
<td></td>
</tr>
<tr>
<td>• have an appreciation for the individual, society, good citizenship, community service, and ethical conduct, and they will be aware of the impact of their designs on humankind and the environment.</td>
<td></td>
</tr>
</tbody>
</table>

*Learning Outcome (a) Addendum: including mathematics through differential equations, calculus-based physics, chemistry, biology, and four technical areas appropriate to civil engineering.*
4. Professional Advisory Board

The Civil Engineering Professional Advisory Board (PAB) was established in 1990 and has since met semi-annually. Demographics of the PAB membership have varied over the years, but diversity has been a pervasive characteristic. While the PAB normally numbers between 15 and 20 members, an individual member may be male or female; younger to older; novice to veteran; practicing engineer or educator; active or retired; a CSU, Chico CIVL graduate or not. While most members are from the northern California region, some represent more distant reaches. Maintaining the ranks has not been difficult since many members have repeatedly re-enlisted after their terms have expired and there has always been an ample list of candidates to fill open positions. The board is autonomous from the department although they welcome guidance and suggested tasks from the faculty.

While the PAB reflects a variety of interests, all members share a strong commitment to program assessment and improvement and, as a result, the PAB is one of the most valuable assessment means available to the department. Among other things, the board has also assisted with curriculum design, constituent outreach, fundraising, and advocacy. The board is invaluable at reviewing the program’s educational goals and objectives and the survey instruments used for alumni and employer feedback. They also regularly review and evaluate the Program Improvement Plan and all companion editions of the Program Improvement Report.

5. Engineering Accreditation Commission of ABET

The Engineering Accreditation Commission of ABET is the accepted national standard for accreditation of engineering programs. An accreditation review is a valuable catalyst for faculty self-reflection on program effectiveness. Following completion of an accreditation review, ABET will also provide statements regarding program strengths and inadequacies. Inadequacies are divided into three categories: a deficiency indicates that a particular accreditation criterion is not satisfied; a weakness indicates that a criterion is currently satisfied but will deteriorate without remedial action; and a concern indicates a criterion is currently satisfied but that positive action is needed to ensure future compliance.

Consequently, the ABET findings provide valuable targets for program improvement. All inadequacies, regardless of category, must be positively addressed prior to the subsequent accreditation review.

Since the specific details of an ABET accreditation evaluation are a confidential communication between ABET and the educational institution, these details are redacted from the Program Improvement Report before it is made available publicly. However, these details are used internally by the program to help with continued evolution and improvement.
III. Analysis, Interpretation, and Application of Assessment Findings

1. Historical Findings

The breadth of assessment measures employed provides valuable guidance for modifications and improvements to the Civil Engineering program. These activities are compiled in annual Program Improvement Reports, commencing with the 2003-2004 assessment cycle. These reports are archived at:

http://www.csuchico.edu/ce/bs_civil_engineering/program_assessment.shtml

2. Assessment Process

All measures of programmatic assessment, both direct and indirect, are administered according to the protocols described previously. As they are available, assessment data are compiled and summarized under the direction of the department’s program assessment coordinator. This effort culminates over the summer recess for all data collected from the preceding academic year.

Two groups, the CIVL program faculty and the Professional Advisory Board, currently review these summaries. The faculty reviews the assessment findings at a dedicated meeting early in the fall semester, draws conclusions, and suggests possible actions based on the findings. Data summaries and the faculty determinations are then documented in the Program Improvement Report (PIR), which is completed annually under the direction of the program assessment coordinator prior to the fall meeting of the Professional Advisory Board.

Based on its review of the PIR, the Professional Advisory Board may make additional recommendations to the program faculty. Since the board will generally meet subsequent to the completion of that year’s PIR, any board findings will normally be documented in the subsequent year’s PIR.
APPENDIX A: Direct Assessment Measures

Direct Program Assessment

Key features:
1. Identified elements of selected courses are used to measure, on average, student proficiency at attaining learning outcomes.
2. The measure of outcome assessment varies as appropriate to the course and to the outcome.
3. Faculty meet at least once each academic year to review assessment summaries from the previous semester(s).
4. Programmatic changes are considered as applicable.
5. The effectiveness of the assessment is also evaluated and modified as warranted.

Notes:
• Although the assessment is embedded in selected courses, it is not solely the responsibility of these courses to provide the identified outcome; rather, it is a responsibility of the program (i.e., collectively, of all prior courses for which each outcome is a component).
• This assessment plan has all three critical assessment characteristics: it is useful; it is manageable; it is sustainable.

Assessment Components:
Metric - The measure of student proficiency (e.g., a quantitative or qualitative measure of achievement on an assignment or test question that emphasizes the target outcome).
Rubric - Evaluative conclusions versus corresponding descriptions of achievement level (e.g., highest score represents mastery).
Standard - Evaluative result that represents minimally acceptable achievement of proficiency.
If the standard for any outcome is not consistently attained, the CE faculty will consider possible means of strengthening the academic program in support of the outcome.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Course Code</th>
<th>Description</th>
<th>Metric</th>
<th>Rubric</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>a: ability to apply knowledge of mathematics, science, and engineering, including:</td>
<td>MATH 210 Differential Equations</td>
<td>This course is the final of four lower-division mathematics courses required in the CE program. Student success in this course is a measure of cumulative knowledge and ability in mathematics.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td>a2: calculus-based physics</td>
<td>PHYS 203A Mechanics</td>
<td>This course is the first of two lower-division physics courses required in the CE program and is more applicable of these two courses to the CE major. Student success in this course is a measure of cumulative knowledge and ability in mechanics.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td>a3: chemistry</td>
<td>CHEM 111 Chemistry</td>
<td>This course is the lower-division chemistry course required in the CE program. Student success in this course is a measure of cumulative knowledge and ability in chemistry.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td>a4: biology</td>
<td>CVEN 115 Bio. Proc. in Envir. Engine</td>
<td>This course is the lower-division biology course required in the CE program. Student success in this course is a measure of cumulative knowledge and ability in biology.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td>a5: at least four technical areas appropriate to civil engineering</td>
<td>CVEN 419 Structures, Concrete Design</td>
<td>This course provides an assessment of student proficiency in a technical area appropriate to civil engineering - structural and geotechnical engineering.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td></td>
<td>CVEN 431 Environmental Engineering</td>
<td>This course provides an assessment of student proficiency in a technical area appropriate to civil engineering - environmental engineering.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td></td>
<td>CVEN 441 Transportation Engineering</td>
<td>This course provides an assessment of student proficiency in a technical area appropriate to civil engineering - transportation and traffic engineering.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
<tr>
<td></td>
<td>CVEN 443 Water Resource Engineering</td>
<td>This course provides an assessment of student proficiency in a technical area appropriate to civil engineering - water resource engineering.</td>
<td>Student proficiency is measured by the final grade in this course.</td>
<td>Proficiency is demonstrated by obtaining a course grade of C- or better.</td>
<td>At least 80% of CE majors will obtain the minimally acceptable course grade.</td>
</tr>
</tbody>
</table>
b: ability to design and conduct civil engineering experiments, as well as to analyze and interpret the resulting data

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Student Performance</th>
<th>Project Report Evaluation</th>
<th>Minimum Acceptable Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 415 Reinforced Concrete Design</td>
<td>The course includes a three-hour laboratory which requires students to conduct laboratory exercises relating to concrete aggregates, cement, concrete and steel reinforcing. In addition, each student group is required to test, analyze, and predict performance of two reinforced concrete beams. The steel must be tension tested, the concrete must be compression tested, and the resulting strength must be used to predict beam performance. The project is to be presented in a formal design report.</td>
<td>Project report lab is evaluated on a 30-point basis. Typically, 27 to 30 points would represent mastery, 24 points above adequate proficiency, and 21 points adequate proficiency and below 21 points would be indicative that the student lacks proficiency.</td>
<td>The minimum acceptable achievement of proficiency is 21 points on a particular design report. At least 90% of CE Majors will meet the standard.</td>
<td></td>
</tr>
<tr>
<td>CIVL 441 Transportation Engineering</td>
<td>The focus of this course is more on the ability to analyze and interpret data than on the design of experiments. The laboratory projects require that a final procedure be followed in collecting data.</td>
<td>The laboratory reports on the topics of traffic spot-speed studies, traffic volume studies, and traffic accident studies.</td>
<td>Each report is given the score between 0 and 15. Considered in the scoring is report format, neatness, the accuracy and thoroughness of results, a discussion of relevance and accuracy, and students conclusions. An appendix containing data collected in sample calculations is also evaluated.</td>
<td>Each student is required to complete all three reports. A student must receive a score 11 or better on a minimum of two of the reports. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td>CIVL 461 Water Resource Engineering</td>
<td>This course emphasizes the design and analysis of several components related to water resources engineering. Some examples include: 1) String a sewer based on population, peak factors, slope, and clearance velocities; 2) Selecting the number of pumps and stages for a pumped pipeline considering the duty point and power; and 3) Selecting a storm sewer based on municipal codes for return periods and IDF curves.</td>
<td>Student proficiency is measured by a score on the problem in which the student is asked to design one of the specific components mentioned.</td>
<td>The problem is evaluated on a 10-point basis. Typically, 8 points would represent mastery, 6 points above adequate proficiency, and 4 points adequate proficiency and below 4 points would be indicative that the student lacks proficiency.</td>
<td>The minimum acceptable achievement of proficiency is 7 points. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td>CIVL 580C Capstone Design Selection</td>
<td>These capstone design courses are focused on a culminating design project that is often based on real-world projects. Students work in groups to write a final design report and make a final oral presentation.</td>
<td>Proficiency is measured on the grade of the final design report.</td>
<td>Proficiency is demonstrated by obtaining a grade of 70% or better on the final design report.</td>
<td>At least 90% of CE Majors will obtain the minimally acceptable grade.</td>
</tr>
</tbody>
</table>

c: ability to design a system, component, or process to meet desired needs in more than one civil engineering context and within realistic constraints

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Student Performance</th>
<th>Project Report Evaluation</th>
<th>Minimum Acceptable Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 499 Professional Issues in Engineering</td>
<td>Students work on multi-disciplinary teams to research a case study in engineering and society. Each team is required to submit a written report as a team and to make an oral presentation where each team member is required to talk for the same amount of time (approximately 15 minutes).</td>
<td>Each student on a team is evaluated on their presentation in class.</td>
<td>The students are rated as excellent, very good, acceptable, and poor.</td>
<td>A score of ‘acceptable’ (%5) is the minimally acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td>CIVL 595 Capstone Design Project</td>
<td>A team approach is utilized for the proposed study based upon an EPA calling for the design, analyze, and/or testing for the design. This is followed by a contract, progress report, change orders, a draft report, and final report. A presentation is made by the team with each member speaking on a point within the report for an approximate 5-7 minutes each.</td>
<td>Each student is evaluated on their presentation individually and as a team approach.</td>
<td>The students and team are evaluated on a 10-point basis. A score of 9 to 10 represents mastery, a score of 8 represents adequate proficiency, 7 points represent adequate proficiency, and a score below 7 is indicative of a lack of proficiency.</td>
<td>A score of adequate for the individual and as a team is the minimum acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard.</td>
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</table>

d: ability to function on multi-disciplinary teams

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Student Performance</th>
<th>Project Report Evaluation</th>
<th>Minimum Acceptable Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 441 Transportation Engineering</td>
<td>The student is required to prepare a formal proposal that leads to a formal design study report. In evaluating alternatives for final recommendation, the student must propose design criteria/controls and evaluate each alternative based on the criteria.</td>
<td>The measure of proficiency is the student’s formulation and solution of a design problem.</td>
<td>The evaluation of this concept is not easily made quantitative. The instructor provides comments and feedback to the student on problem formulation and evaluation in the proposal review and in evaluating the final design project.</td>
<td>A clear process must be presented by the student that includes the steps: establishment of design criteria and constraints, development of alternatives, evaluation of alternatives, a final recommendation based on the process. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td>CIVL 580C Capstone Design Selection</td>
<td>These capstone design courses are focused on a culminating design project that is often based on real-world projects. Students work in groups to write a final design report and make a final oral presentation.</td>
<td>Proficiency is measured on the final grade in the course.</td>
<td>Proficiency is demonstrated by obtaining a final course grade of C- or better.</td>
<td>At least 90% of CE Majors will obtain the minimally acceptable grade.</td>
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<tr>
<td>i: understanding of professional and ethical responsibility, including the importance of professional licensure</td>
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<td>--------------------------------------------------</td>
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<tr>
<td><strong>EVL 495 Professional Issues in Engineering</strong> Students are required to submit weekly memos on class readings. Each week a particular reading assignment focuses on a selected outcome. The measure of proficiency is the student’s score on a memo assignment. Each assignment is based on the particular outcome to be assessed. Memos are evaluated on a 10-point basis. Generally, 9 to 10 points would represent mastery, 8 points above adequate proficiency, 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. A score of 7 on a particular memo assignment would be the minimally acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard.</td>
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<tr>
<td><strong>EVL 595 Capstone Design Project</strong> A reading assignment is required on the subject of ethics in writing. Business relationships, the process of working with clients, procedures used to obtain consulting work, and other practices in operating a professional engineering services business are carefully addressed in the course. Exam questions address issues in client relationships and contracting for engineering services. Test questions are assigned a score to equal 10% of the final grade. A score of at least 70% on these questions that include the topics of ethical and professional responsibility is required to achieve adequate proficiency. At least 90% of CE Majors will meet the standard.</td>
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<th>j: ability to communicate effectively</th>
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<tbody>
<tr>
<td><strong>EVL 595 Capstone Design Project</strong> Communication through writing is certainly a major theme of course. Special attention is given to writing e-mails, ordinary business correspondence, press releases, feasibility studies, proposals, and contract language. Student proficiency is measured by scores on individual assignments listed above. Possible scores are as follows: ordinary business correspondence-10 points, proposal-20 points, contract-30 points, design/analyze/feasibility study-50 points. A score of 70% of the possible score on at least 3 of the 5 items. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td><strong>EVL 590C Capstone Design Selection</strong> Those capstone design courses are focused on a culminating design project that are often based on real-world projects. Students work in groups to write a final design report and make a final oral presentation. Proficiency is measured on the grade of the final oral report. Proficiency is demonstrated by obtaining a grade of 75% or better on the final oral presentation. At least 90% of CE Majors will obtain the minimally acceptable grade.</td>
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<tr>
<th>k: broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</th>
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<tbody>
<tr>
<td><strong>EVL 435 Environmental Engineering</strong> Students are required to perform a lifecycle analysis of wastewater treatment systems, including a calculation of the carbon footprint of a treatment plant using both mechanized and natural systems. Student proficiency is measured by the score on a particular assignment, which may be a test question or a laboratory exercise. Tests or lab exercises are evaluated on a 10-point basis. Generally, 9 to 10 points would represent mastery, 8 points above adequate proficiency, 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. A score of 7 on an assignment is the minimally acceptable proficiency. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td><strong>EVL 495 Professional Issues in Engineering</strong> Students are required to submit weekly memos on class readings. Each week a particular reading assignment focuses on a selected outcome. The measure of proficiency is the student’s score on a memo assignment. Each assignment is based on the particular outcome to be assessed. Memos are evaluated on a 10-point basis. Generally, 9 to 10 points would represent mastery, 8 points above adequate proficiency, 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. A score of 7 on a particular memo assignment would be the minimally acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard.</td>
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<tr>
<th>l: recognition of the need for, and an ability to, engage in lifelong learning</th>
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</thead>
<tbody>
<tr>
<td><strong>EVL 495 Professional Issues in Engineering</strong> Students are required to submit weekly memos on class readings. Each week a particular reading assignment focuses on a selected outcome. The measure of proficiency is the student’s score on a memo assignment. Each assignment is based on the particular outcome to be assessed. Memos are evaluated on a 10-point basis. Generally, 9 to 10 points would represent mastery, 8 points above adequate proficiency, 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. A score of 7 on a particular memo assignment would be the minimally acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard.</td>
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</table>

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<tr>
<th>m: knowledge of contemporary issues</th>
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<tbody>
<tr>
<td><strong>EVL 495 Professional Issues in Engineering</strong> Students are required to submit weekly memos on class readings. Each week a particular reading assignment focuses on a selected outcome. The measure of proficiency is the student’s score on a memo assignment. Each assignment is based on the particular outcome to be assessed. Memos are evaluated on a 10-point basis. Generally, 9 to 10 points would represent mastery, 8 points above adequate proficiency, 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. A score of 7 on a particular memo assignment would be the minimally acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard.</td>
</tr>
<tr>
<td><strong>EVL 595 Capstone Design Project</strong> Students are required to research a legal topic: law, ordinance, statute, regulation, judicial decision, or the like. Included should be the dates of the issue, purpose, who issued it, who enforces the issue, economic and non-economic consequences, who benefits, who is harmed, and is it effective. The presentation is based upon the extent of the research and the presentation. The presentation is based upon a 10-point scale. A 9-10 represents mastery, a 7 is adequate, and below 7 is indicative of the fact that the student lacks proficiency. A score of 7 on a particular presentation would be the minimally acceptable achievement level of proficiency. At least 90% of CE Majors will meet the standard.</td>
</tr>
</tbody>
</table>
### 1: ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

| Course Code | Course Title | Description | Proficiency Measurement | Scoring | Minimum Acceptable Achievement | Example
|-------------|--------------|-------------|-------------------------|---------|-------------------------------|---------
| CIVL 461 | Water Resource Engineering | Students are required to use both computer skills and field techniques in this course. Students perform stream gaging in Big Chico Creek using an Acoustic Doppler Velocimeter (ADV) to measure point velocities. They need to choose the stream cross section and select the number of sampling points (spacing). Then take this data into Excel and apply the USGS induction method to determine the volumetric flow rate. | Student proficiency is measured by the score on this assignment. | The problem is evaluated on a 10 point basis. Typically, 9 to 10 points would represent mastery, 8 points above adequate proficiency, and 7 points below adequate proficiency, would be indicative that the student lacks proficiency. | The minimally acceptable achievement of proficiency is 7 points. At least 90% of CE Majors will meet the standard. |
| CIVL 500C | Capstone Design Project | These capstone design courses are focused on a culminating design project based on realistic civil engineering projects. The design project requires use of modern software tools, analysis techniques, and/or lab testing procedures. | Proficiency is measured by the percent score in a section of the final design report that requires the use of techniques, skills, or modern engineering tools. | This section of the design report is evaluated on a percentage basis of the number of points available for that section. Typically, >90% would represent mastery, 80-90% represents adequate proficiency, 70-80% represents proficiency, and <70% indicates lack of proficiency. | The minimally acceptable achievement of proficiency is 70%. At least 90% of CE Majors will meet the standard. |

### 2: understanding of basic concepts in management, business, public policy, and leadership

| Course Code | Course Title | Description | Proficiency Measurement | Scoring | Minimum Acceptable Achievement | Example
|-------------|--------------|-------------|-------------------------|---------|-------------------------------|---------
| CIVL 490 | Professional Issues in Engineering | Students are required to submit weekly memos on class readings. Each week a particular reading assignment focuses on a selected outcome. | The measure of proficiency is the student’s score on a memo assignment. Each assignment is based on the particular outcome to be assessed. | Memos are evaluated on a 15 point basis. Generally, 9 to 10 points would represent mastery, 8 points above adequate proficiency, 7 points adequate proficiency, and below 7 points would be indicative that the student lacks proficiency. | A score of 7 on a particular memo assignment would be the minimally acceptable achievement of proficiency. At least 90% of CE Majors will meet the standard. |
| CIVL 595 | Capstone Design Project | Organizations and operations of a consulting civil engineering company is formally covered in class. Leadership is covered related to motivation and protection of employees in a consulting business. A text chapter on leadership is assigned. | Students are required to write a service contract with budget, performance protections related to professional liability. | Contract is evaluated on a 10 point scale. Leadership is evaluated during the overall presentation. | A score of 70% is required on the contract and on the presentation in relation to leadership. At least 90% of CE Majors will meet the standard. |
APPENDIX B: Sample Assessment Summary – Data Collection

CIVL Program Outcome Assessment Summary V3

<table>
<thead>
<tr>
<th>Outcome</th>
<th>g: ability to communicate effectively</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester</td>
<td>Fall 2014</td>
</tr>
<tr>
<td>Major</td>
<td>CIVL</td>
</tr>
<tr>
<td>Course</td>
<td>CIVL 500C Capstone Design Selection</td>
</tr>
<tr>
<td>Instructor</td>
<td>Oakley</td>
</tr>
</tbody>
</table>

Description: These capstone design courses are focused on a culminating design project that are often based on real-world projects. Students work in groups to write a final design report and make a final oral presentation.

Metric: Proficiency is measured on the grade of the final oral report.

Rubric: Proficiency is demonstrated by obtaining a grade of 70% or better on the final oral presentation.

Standard: At least 90% of CE majors will obtain the minimally acceptable grade.

Minimally acceptable achievement (the Standard): 70
Number of students achieving the Standard: 9
Number of student failing the Standard: 1
Percentage of students achieving the Standard: 90.0%

Acceptable

Comments related to student performance at achieving this outcome measurement:
Eight out of nine students achieved the outcome. The only one who didn’t missed the class presentations.

Comments related to the suitability of this outcome measurement:
Adequate for this design class.

Suggestions for possible changes to this outcome measurement:

Enter information in the yellow fields. Do not change the file name. Return to Mills.
APPENDIX C: Graduating Senior Survey Instrument

College-Wide Survey Questions

Note: This is an online survey, so the display quality below does not illustrate the actual quality when viewed online. Access to the survey is controlled by student identification number.

ECC Graduating Senior Survey
College of Engineering, Computer Science, and Construction Management
CSU, Chico

Dear Graduating Senior,

The College of ECC has developed this Survey to give you a forum for letting us know what you think of your experience at CSU, Chico, and to help us to continually improve the curriculum and services we offer. We care a great deal about the programs and your feedback is essential to helping us provide the highest quality education we can deliver. Thank you in advance for your time and attention to this survey.

We hope the years you have spent with us have enriched your life and provided you with the foundation for a successful career. Please stay in touch!

With best wishes, The College of ECC Faculty

Educational Satisfaction Questions

At Chico State, how satisfied were you with the...

1. Quality of teaching by faculty in your department
2. Quality of teaching by other faculty
3. Access to faculty in your department
4. Availability of courses in your department
5. Quality of courses in your department
6. Access to laboratory facilities and equipment
7. Quality of laboratories and equipment
8. Access to computer facilities
9. Quality of computer facilities
10. Academic Advising from your major advisor
11. Academic Advising from the University Advising Office
12. Career information from your department
13. Availability of General Education courses

Very Dissatisfied | Very Satisfied

...
14. Quality of General Education courses
15. The overall quality of your education
16. Your overall experience at Chico State

Program Outcomes Questions

Based on your educational experience here at Chico State, how well prepared are you to...

17. Apply knowledge of math, science, engineering, or technology to solve problems
18. Design and execute test procedures (for equipment/hardware components or software)
19. Analyze, assess, and interpret data/results from test procedures
20. Design a component or system to meet desired needs
21. Function in a multidisciplinary team
22. Identify, formulate and solve technical problems
23. Communicate technical matters in writing
24. Communicate technical matters orally
25. Understand and apply professional and ethical principles
26. Understand contemporary issues facing society
27. Use modern tools and technology
28. Appreciate impact of your solutions on society and environment
29. Continue learning

30. I would recommend my major program at CSU, Chico to others.

Page Break

Please Select One...
- APCG [APCG]
- CINS [CINS]
- CIMT [CIMT]
- CIVL [CIVL]
- CMGT [CMGT]
- CMPE [CMPE]
- CSCI [CSCI]
- EENG [EENG]
- MENG [MENG]
- MECA [MECA]
- SMFG [SMFG]
- Other [Other]

31. Major: 
32. Graduation Date
33. Semester 

- 17 -
33. Did you come to Chico State as a ...
- First-time freshman
- Transfer

34. How many semesters did you attend Chico State?
- 1-3
- 4-6
- 7-9
- 10-12
- 13+

35. What is your Overall GPA?
- Below 2.25
- 2.25-2.49
- 2.50-2.74
- 2.75-2.99
- 3.00-3.24
- 3.25-3.49
- 3.50-3.74
- 3.75-4.00

36. If you had an internship, co-op, or job related to your major while in school, how valuable was the experience?
- Did not have internship, co-op, or job
- Very Valuable
- Somewhat Valuable
- Not Valuable

37. If you were involved in any student/professional society, activities, or clubs, how valuable was the experience?
- Was not involved in societies, activities, or clubs
- Very Valuable
- Somewhat Valuable
- Not Valuable

38. Immediately after graduating are you planning to...
- Attend graduate School
- Begin Working

39. How many job offers have you received?
- None
- One
- Two
- Three
- Four +

40. Do you currently have a job offer that you are likely to accept?
- Yes
- No

Nested Question Group for Response [1] of question [Q10]
If 'Yes,' Please provide:
Company Name:
You Have 50 Characters Remaining.

Your Job Title: [Redacted]
You Have 50 Characters Remaining.

Starting annual Salary [Redacted]
- Less than $30k
- $30k-$40k
- $41k-$50k
- $51k-$60k
- $61k-$70k
- $71k or more

41. If you interviewed through the campus Career Planning & Placement Office, how helpful was it? [Redacted]
- Did not interview through campus office
- Very Helpful
- Helpful
- Somewhat Helpful
- Not Helpful

42. If you found a job that you are likely to accept, how did you find it? [Redacted]
- Campus Career Planning & Placement Office
- Faculty/department referral
- Online Posting
- Mailed resume
- Personal Connections
- Other

Please Specify: [Redacted]
You Have 3500 Characters Remaining

43. Did you take a comprehensive exam (FE, CMfgT, MFT or other) for your discipline? [Redacted]
- No, did not take
- Yes, and passed
- Yes and did not pass
- Yes and waiting for results

44. If you took a comprehensive exam, did you also attend a review course to prepare you for the exam? [Redacted]
- Yes
- No

Nested Question Group for Response [1] of question [Q14]
If 'Yes,' how valuable was the course? [Redacted]
- Very Valuable
- Valuable
45. How satisfied are you with the department support you received while enrolled at Chico State?  
- Very dissatisfied
- Somewhat dissatisfied
- Neutral
- Somewhat satisfied
- Very satisfied

46. How often did you meet with someone in the University Advising Office?  
- More than once a semester
- Once a semester
- Once a year
- Less than once a year
- Never

47. How often did you meet with your major (departmental) advisor?  
- More than once a semester
- Once a semester
- Once a year
- Less than once a year
- Never

48. How has the quality of your educational experience varied over the time period you were enrolled at Chico State?  
- Quality improved significantly
- Quality improved somewhat
- Quality stayed fairly consistent
- Quality declined somewhat
- Quality decline considerably

49. Permanent e-mail Address (so we can keep in touch)  
You Have 3500 Characters Remaining
CIVL Major-Specific Survey Questions
Note: This is a new major-specific survey planned for implementation beginning Fall 2015.

ECC Graduating Senior Survey

CIVL Supplemental Questions

Please mark the level of preparation that was provided by your education at CSU, Chico for each of the following areas.

CIVL Q1 1. Land Surveying
CIVL Q2 2. Land Development
CIVL Q3 3. Construction
CIVL Q4 4. Structures
CIVL Q5 5. Geotechnical
CIVL Q6 6. Transportation
CIVL Q7 7. Environmental
CIVL Q8 8. Water Resources
CIVL Q9 9. Management
CIVL Q10 10. Education
CIVL Q11 11. Comprehensive Design
CIVL Q12 12. Other Engineering Related
CIVL Q13 13. Non-Engineering Related

Please mark the level of preparation that was provided by your education at CSU, Chico for each of the following CE program goals.

CIVL Q14 14. BSCE graduates will be effective engineers.
CIVL Q15 15. They will be effective problem solvers.
CIVL Q16 16. They will be educated in engineering sciences.
CIVL Q17 17. They will be able to utilize a variety of engineering tools and techniques to enhance their professional abilities.
CIVL Q18  18. They will be familiar with applicable regulatory and professional issues.

CIVL Q19  19. They will be effective technical writers.

CIVL Q20  20. They will be effective oral communicators.

CIVL Q21  21. They will be able to function effectively in multi-disciplinary teams.

CIVL Q22  22. They will appreciate good citizenship, community service, and ethical conduct.

CIVL Q23  23. They will be aware of the impact of their designs on humankind and the environment.
APPENDIX D: Alumni Survey Instrument

To All CSU, Chico, Civil Engineering Alumni:

The most vital measure of the quality of our academic program is the success of our graduates. Please help us to assess the preparation provided by the CE program by completing the following survey. The responses that you provide will be combined with those from other alumni solely to produce summary data. Individual personal responses will be treated as strictly confidential.

Keep us informed of address and employment changes with the Alumni Information Form, available at http://www.csuchico.edu/ce - click on the Alumni and Friends tab. Please also encourage other alumni to stay in touch as well. Thank you for your assistance. We look forward to hearing from you. To assist with program accreditation, please return the survey as soon as possible, but no later than April 30, 2015.

Dr. Russell S. Mills, P.E., Professor of Civil Engineering and Program Assessment Coordinator

1. Please return the survey in the provided postage-paid envelope
   1.1 Please print your Name, Address, and Email address

1.2 The year you received the BSCE from CSU, Chico
   □ 2009-2014

1.3 Academic status upon entering CSU, Chico
   □ Freshman   □ Community college transfer   □ 4-Year college transfer
   □ Post baccalaureate   □ Other
   □ (If 'Other', please describe)

1.5 Professional licensure attained (mark all that apply)
   □ FE/EIT   □ PE/CE   □ Other
   □ (If 'Other', please describe)

1.7 Current position/title

F38U08517P1P10V0 03/13/2015, Page 1 of 3
1. Please return the survey in the provided postage-paid envelope [Continue]

1.8 Please print your employer name, address, and your supervisor's name and title.

1.9 Years in your current position

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</table>

1.10 Current annual income

<table>
<thead>
<tr>
<th></th>
<th>Less than $41K</th>
<th>$41-60K</th>
<th>More than $61-80K</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$61-100K</th>
<th>More than $100K</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
</tr>
</tbody>
</table>

1.11 Nature of employment

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Industry</th>
<th>Consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Education</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
</tr>
</tbody>
</table>

1.12 (If 'Other', please describe)

1.13 Have you completed additional education and/or training (mark all that apply)?

<table>
<thead>
<tr>
<th></th>
<th>Conferences</th>
<th>Workshops</th>
<th>Short Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Graduate Studies</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td></td>
<td>☑</td>
</tr>
</tbody>
</table>

1.14 How many professionally-related educational opportunities do you seek annually?

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1-2</th>
<th>3-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>More than 6</th>
<th>3-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>5-6</th>
<th>More than 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
</tr>
</tbody>
</table>

1.15 Please indicate how many professional and/or community groups you currently participate in.

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☑</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Annually</th>
<th>Seldom</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td></td>
<td>☑</td>
</tr>
</tbody>
</table>

1.16 How often do you present information to professional audiences?

Please mark the level of preparation that was provided by your education at CSU, Chico for the following areas in which you have practiced since graduation. For each area you have not practiced, please mark N/A.

<table>
<thead>
<tr>
<th>(1) Very Unprepared</th>
<th>(2) Unprepared</th>
<th>(3) Neutral</th>
<th>(4) Prepared</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.17 Land Surveying
1.18 Land Development
1.19 Construction
1.20 Structures
1.21 Geotechnical
1.22 Transportation
1.23 Environmental
1.24 Water Resources
1.25 Management
1.26 Education
1.27 Comprehensive Design
1.28 Other Engineering Related
1.29 Non-Engineering Related
1. Please return the survey in the provided postage-paid envelope [Continue]

For each of the following CE program goals, mark the level of preparation that was provided by your education at CSU, Chico:

1.30 BSCE graduates will be effective engineers.  
1.31 They will be effective problem solvers.  
1.32 They will be educated in engineering sciences.  
1.33 They will be able to utilize a variety of engineering tools and techniques to enhance their professional abilities.  
1.34 They will be familiar with applicable regulatory and professional issues.  
1.35 They will be effective technical writers.  
1.36 They will be effective oral communicators.  
1.37 They will be able to function effectively in multi-disciplinary teams.  
1.38 They will appreciate good citizenship, community service, and ethical conduct.  
1.39 They will be aware of the impact of their designs on humankind and the environment.

1.40 Please comment on the program goals listed above (questions 1.30 – 1.39). What changes to these goals should be considered? Should any of these goals be eliminated or new ones added?

1.41 Are there any additional comments you would like to make regarding the CE program at CSU, Chico? Consider both possible strengths and weaknesses that may exist in the program.

Thank you!
APPENDIX E: Employer Survey Instrument

To All Employers of CSU, Chico, Civil Engineering Graduates:

The most vital measure of our academic program is the success of our graduates. Our records indicate that you supervise one or more graduates of our program. Please help us to assess the preparation provided by our CE program by completing the following survey. The responses that you provide will be combined with those from other employers solely to produce summary data. Individual responses will be treated as strictly confidential.

If you are not the appropriate person to complete this survey, please ask someone who is to provide us with this information. Multiple responses from one employer are acceptable, but only if the responses are from supervisors of different graduates – otherwise, please provide only one response. For situations involving multiple supervisors of the same graduate(s), please collaborate on a single response.

Please encourage your Chico State employees to keep us informed of their contact information with the Alumni Information Form, available at http://www.csuchico.edu/ce - click on the Alumni and Friends tab. Thank you for your assistance. We look forward to hearing from you. To assist with program accreditation, please return the survey as soon as possible, but no later than May 31, 2015.

Dr. Russell S. Mills, P.E., Professor of Civil Engineering and Program Assessment Coordinator

1. Please return the survey in the provided postage-paid envelope
   1.1 Please print the organization name, address, and your name, position title and email address.

   1.2 Nature of employment
       □ Government        □ Industry        □ Consulting
       □ Education         □ Other

   1.3 (If ‘Other’, please describe)

   1.4 Years in your current position
       □ 0-3                □ 4-6                □ 7-9
       □ 10-12              □ More than 12         □
       □ Yes                □ No

   1.5 Are you an engineer?
       □ Yes                □ No

   1.6 Are you a CSU, Chico CE graduate?
       □ Yes                □ No

   1.7 Approximate number of all CE graduates employed at your organization
       □ 1-5               □ 6-10               □ 11-25
       □ 5-50              □ More than 50         □

   1.8 Approximate number of all CE graduates you supervise
       □ 1-5               □ 6-10               □ 11-25
       □ 5-50              □ More than 50         □

   1.9 Approximate number of CSUC CE graduates you supervise
       □ 1-5               □ 6-10               □ 11-25
       □ 5-50              □ More than 50         □
1. Please return the survey in the provided postage-paid envelope [Continue]

1.10 Does your organization have a rotation or other type of training program for new CE graduates?
   - Yes
   - No

1.11 Does your organization provide support for continuing education of employees (including graduate studies)?
   - Yes
   - No

1.12 Does your organization encourage employees to seek professional licensure?
   - No
   - Yes, it is encouraged
   - Yes, it is strongly encouraged
   - Yes, it is expected

1.13 Does your organization have a matching gift program for charitable donations by employees?
   - Yes
   - No

Please mark the level of preparation demonstrated by the CSUC CE graduates you supervise for the following disciplinary areas in which they practice. For each area they do not practice, please mark N/A.

<table>
<thead>
<tr>
<th>Area</th>
<th>(1) Very Unprepared</th>
<th>(2) Unprepared</th>
<th>(3) Neutral</th>
<th>(4) Prepared</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Surveying</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Structures</td>
<td></td>
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<td></td>
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<tr>
<td>Geotechnical</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Transportation</td>
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<tr>
<td>Environmental</td>
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<tr>
<td>Water Resources</td>
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<tr>
<td>Management</td>
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<tr>
<td>Education</td>
<td></td>
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<td>Comprehensive Design</td>
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<tr>
<td>Other Engineering Related</td>
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<tr>
<td>Non-Engineering Related</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Please return the survey in the provided postage-paid envelope. [Continue]

For each of the following CE program goals, mark the level of preparation demonstrated by the CSUC CE graduates you supervise:

1.27 BSCE graduates will be effective engineers.
1.28 They will be effective problem solvers.
1.29 They will be educated in engineering sciences.
1.30 They will be able to utilize a variety of engineering tools and techniques to enhance their professional abilities.
1.31 They will be familiar with applicable regulatory and professional issues.
1.32 They will be effective technical writers.
1.33 They will be effective oral communicators.
1.34 They will be able to function effectively in multi-disciplinary teams.
1.35 They will appreciate good citizenship, community service, and ethical conduct.
1.36 They will be aware of the impact of their designs on humankind and the environment.
1.37 Please comment on the program goals listed above (questions 1.27 – 1.36). What changes to these goals should be considered? Should any of these goals be eliminated or new ones added?

1.38 Are there any additional comments you would like to make regarding the CE program at CSU, Chico? Consider both possible strengths and weaknesses that may exist in the program.

Thank you!