Colorado State University – Pueblo Academic Program Assessment Report for AY 2016-2017

Program: Bachelor of Science in Civil Engineering Technology (BSCET) **Date:** June 1, 2017

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Listed below are the CET student learning objectives:

Generic Engineering Technology student learning outcomes: Students who complete the CET program at CSU-Pueblo will have the ability to:

a. apply knowledge, techniques, skills, and tools of the civil engineering discipline to engineering technology activities,
b. select and apply a knowledge of mathematics, science, engineering, and technology to civil engineering technology problems,
c. conduct standard tests and measurements; analyze and interpret experimental data; and apply experimental results to improve processes,
d. design systems, components, or processes for civil engineering technology problems,
e. function effectively as a members or leaders on a technical team,
f. identify, analyze, and solve broadly-defined engineering technology problems, **
g. communicate effectively regarding subjects related to engineering technology activities,
h. demonstrate a disposition to engage in self-directed continuing professional development, **
i. demonstrate an understanding of professional and ethical responsibilities,
j. demonstrate an understanding of the impact of engineering technology solutions to society, and
k. demonstrate commitment to quality, timeliness, and continuous improvement.

Civil Engineering Technology Student learning outcomes: In order to enable graduates to attain the CET program educational objectives, CET students are trained to acquire specific skills and the ability to:

A. utilize principles and appropriate technology to produce drawings, reports, quantity estimates, and other documents related to civil engineering;
B. conduct standardized field and laboratory tests related to civil engineering;
C. utilize surveying methods and equipment to perform land measurement or construction layout;
D. apply fundamental computational methods and elementary analytical techniques to solve civil engineering technology problems.
E. plan and prepare documents appropriate for design and construction;
F. perform economic analyses and cost estimates related to design, construction, operations and maintenance of systems associated with civil engineering; **
G. select appropriate engineering materials and practices
H. perform standard analysis and design of elements for structures, hydraulic and hydrologic systems, construction operations, and transportation systems.

** Indicates learning outcomes assessed during the 2016/2017 cycle.

Please describe the 2016-2017 assessment activities for the program in Part I. Use Column H to describe improvements planned for 2016-2017 based on the assessment process. In Part II, please describe

activities engaged in during 2016-2017 designed to close-the-loop (improve the program) based on assessment activities and the information gathered in 2016-2017. Thank you.

I. Program student learning outcomes (SLOs) assessed in this cycle, processes, results, and recommendations.

A. Which of the program SLOs were assessed during this cycle? Please include the outcome(s) verbatim from the assessment plan.	B. When was this SLO last assessed? Please indicate the semester and year.	C. What method was used for assessing the SLO? Please include a copy of any rubrics used in the assessment process.	D. Who was assessed? Please fully describe the student group(s) and the number of students or artifacts involved.	E. What is the expected achievement level and how many or what proportion of students should be at it?	F. What were the results of the assessment?	G. What were the department's conclusions about student performance?	H. What changes/improvements to the program are planned based on this assessment?
f. identify, analyze, and solve broadly-defined engineering technology problems,	Fall 2016 and Spring 2017	In Spring 2016, 7 a CET elective course, CET 475 EIT Preparation Training course has been offered. This course includes all the materials required for the NCEES held Fundamental of Engineering (FE) exam.	Students enrolled in CET 475 was 8 in Spring 2017.	Fifty (50) percent of students achieve an overall score of 70 %. The rest 50% students scored more than 60% but less than 70%.	They are ready for taking the NCEES held Fundamental of Engineering (FE) exam which is the first (out of 2) exam for the engineering licensure.	While studying the course, they learned the skills required to take the FE exam and practice in real life.	Students should be motivated taking the NCEES held Fundamental of Engineering (FE) exam. Some other courses such as CET 404, 405, 412, 415 are to be improved to reflect this outcome.
h. demonstrate a disposition to engage in self-directed continuing professional development,	Spring 2017	Students in senior project course, CET 456 were given an opportunity to conduct research based project and present in conference	Students from CET 456 course who selected research-based project. Two students selected this options.	Students were expected that their research should be accepted by an in-state or out-of-state conference.	Both of them successfully presented their research project in El Paso, Texas and also in the CSU Pueblo Student symposium.	This is the first time, the department adopted this option and it was a full success.	Number of students picking this option will have to be increased by motivation. In addition, visits from professional industry for recruitment is to be increased.
F. perform economic analyses and cost estimates related to design, construction, operations and maintenance of systems associated with civil engineering	Fall 2016	A course, CET 305 Heavy Highway Estimating is offered in each fall.	Students enrolled in CET 305.	At least 70% students is expected to score at least B.	88% students were graded B or above.	This is the first time, the department adopted this option and it was a full success.	This operation will be continued.

Rubric used in the CET 475 course can be presented as follows –

Score	Description
Above 80%	Excellent
70 to 79%	Good
60 to 69%	Fair
50 to 59%	Average
40 to 49%	Below average
Below 40%	Unacceptable

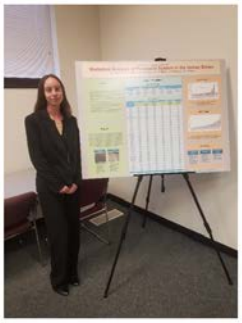
The performance of the 8 students in the CET 475 course is listed below –

	Units, Ethics	Math, Statistics	Statics, Dynamics	Mechanics, Materials	Fluids, Hydraulics	Economics, Tools, Structures	Geotechnical Engineering	Transportation Engineering	Concrete	Steel Design	Surveying, construction, Environment	Full Exam 1	Full Exam 2	Full Exam 3	Average
	Exam 1	Exam 2	Exam 3	Exam 4	Exam 5	Exam 6	Exam 7	Exam 8	Exam 9	Exam 10	Exam 11				
1	95	36	48	62	29	41	65	100	59	71	47	67	64	64	61
2	74	53	57	50	41	41	53	72	77	88	82	65	63	66	63
3	82	45	38	50	82	76	64	77	70	76	65	71	75	73	66
4	80	53	43	56	59	41	59	76	71	88	71	63	73	70	65
5	66	61	87	58	52	64	68	77	70	70	65	65	60	75	67
6	82	56	62	67	65	71	82	82	88	94	82	74	74	79	76
7	82	42	67	62	65	59	88	94	82	76	82	90	75	83	75
8	87	31	62	76	47	65	53	72	59	71	71	68	74	75	65

Research papers presented by the two undergraduate students are listed as –

1. Millemon, R., Islam, M. R., Mincic, M. (2017). Evaluation of BELLS3 Temperature Prediction Model for Asphalt Pavement Design, *The Southwest Emerging Technology Symposium (SETS)*, UTEP, April 1st, 2017, El Paso, Texas.
2. Millemon, R., Islam, M. R., Mincic, M. (2017). Evaluation of BELLS3 Temperature Prediction Model for Asphalt Pavement Design, *CSU-Pueblo Student Symposium, April 7, 2017.*
3. Jill, R., Islam, M. R., Mincic, M. (2017). Statistical Analysis of Pavement System in the US, *The Southwest Emerging Technology Symposium (SETS)*, UTEP, April 1st, 2017, El Paso, Texas.
4. Jill, R., Islam, M. R., Mincic, M. (2017). Statistical Analysis of Pavement System in the US, *CSU-Pueblo Student Symposium, April 7, 2017.*
5. Jill, R., Islam, M. R., Mincic, M. (2017). Effects of Design Parameters on the Performances of Flexible Pavement, *The Southwest Emerging Technology Symposium (SETS)*, April 1st, 2017, El Paso, Texas.

Two undergraduate students during presentation are shown below –



DESCRIPTION of CET 305 Heavy Highway course
Estimating relating to heavy and highway construction. Covers heavy equipment selection and use, project scheduling and production rates.

PRESENTATIONS:
Students are put into small groups (up to 3 students) to make a 15 minute presentation on various pieces of construction equipment. Students evaluate and comment on each other as well as the instructor.

A	12	44%
B	10	37%
C	5	19%
D	0	0%
F	0	0%

HOMEWORK:
Eight problems primarily from the textbook and some supplemental materials. These assignments are a breakdown of the overall estimating process in small pieces or steps.

A	10	31%
B	13	4%
C	3	1%
D	9	9%
F	14	44%

DUMONT BID (ESTIMATE #1):
Teams of about 4 students are assigned to further examine the concrete demolition portion of the Dumont project. Variables include equipment selection, demolition methodology, transportation method, and location of disposal of waste concrete. Again, results are posted during class for comparison as well as team presentations primarily focused on what processes were utilized to solve the unknown portions of the project.

A	2	8%
B	16	64%
C	6	24%
D	1	4%
F	0	0%

FINAL PROJECT (ESTIMATE #2):
This is a heavy civil earth embankment project with minor structures. Students remain in the previous groups to develop a second estimate. Students have to decide how to estimate a given project. Equipment selection is restricted to help students focus on quantity takeoffs, equipment productivities,

and what bid items to focus their time on. Concepts such as pre bid questions and construction addendum are emphasized.

A	2	8%
B	16	64%
C	6	24%
D	1	4%
F	0	0%

FINAL EXAM:
A comprehensive final exam focusing on tasks similar to homework problems, information from the textbook, and information presented during equipment presentations.

A	4	12%
B	8	25%
C	13	41%
D	2	6%
F	5	16%

FINAL WEIGHTED COURSE GRADES:

A	12	44%
B	12	44%
C	1	4%
D	2	7%

Group Oral Presentation Rubric

4	3	2	1
All group members participate equally.	All group members participate.	Some group members participate.	Only 1 or 2 group members participate.
Group members help each other as needed.	Group members help each other as needed.	Some group members speak clearly and are easy to understand.	Most group members are hard to understand.
All group members speak clearly and are easy to understand.	Most group members speak clearly and are easy to understand.	Some group members speak clearly, but are difficult to understand.	Only 1 or 2 group members speak and can be understood.
All group members speak to the entire audience.	Most group members speak to the entire audience.	Group members speak to only part of the audience.	Most group members speak only to part of the audience.
Information is presented in an organized way.	Information is presented in an organized way.	Information may be only partially organized.	Information is presented in a disorganized way.
Oral presentation includes many details.	Oral presentation includes some details.	Oral presentation includes few details.	Oral presentation includes few or no details.
Presentation is visually organized and complete.	Presentation is organized and complete.	Presentation is complete.	Presentation is disorganized or incomplete.

Oral Communications Assessment Rubric

Course No.: _____ Date: _____

Team/Student: _____ Reviewer: _____

Topic (Weight)	Unacceptable (0)	Marginal (1)	Acceptable (2)	Exceptional (3)	Points
ABET – G2 Organization & Structure **Weight: 1**	θ Not possible to understand presentation due to absence of structure.	θ Difficult to follow presentation due to erratic topical shifts and jumps.	θ Most information is presented in logical order which is easy to follow.	θ All information is presented in a logical, interesting and novel sequence, which is easily followed.	
ABET – G2 Content & Knowledge **Weight: 3**	θ No grasp of information. Unable to answer questions about subject.	θ Uncomfortable with information. Capable only of answering rudimentary questions.	θ At ease with content and able to elaborate and explain to some degree.	θ Demonstration of full knowledge of the subject with explanations and elaboration.	
ABET – G2 Visual Aids & Neatness **Weight: 2**	θ No visual aids.	θ Occasional use of visual aids, however they barely support text or presentation. Several misspellings and/or grammatical errors on slides.	θ Visual aids are related to text and presentation. Minor misspellings and/or grammatical errors.	θ Text and presentation are reinforced by the use of visual aids. Negligible misspellings and/or grammatical errors.	
ABET – G2 Delivery & Speaking Skills **Weight: 2**	θ Significant mumbling and incorrect pronunciation of terms. Voice level too low or too high. Monotonous, no eye contact, rate of speech too fast or too slow	θ Occasional mispronunciation of terms. Little eye contact, uneven rate, only little expression	θ Voice is clear and at a proper level. Most words pronounced correctly. Some eye contact, steady rate, excessively rehearsed	θ Clear voice and correct, precise pronunciation of terms. Good eye contact, steady rate, enthusiasm, confidence	
ABET – G2 Presentation Length **Weight: 1**	θ Too long or too short. +/– 10 minutes	θ +/– 6 minutes	θ +/– 4 minutes	θ +/– 2 minutes	
OVERALL PERFORMANCE	θ Unacceptable	θ Marginal	θ Acceptable	θ Exceptional	**TOTAL**
POINTS REQUIRED	**0–6**	**7–13**	**14–20**	**21–27**	

Team member evaluation rubric

	Unacceptable (0)	Marginal (1)	Acceptable (2)	Exceptional (3)	Points
Name of team member					
Preparation for meetings (2)	Little or no advance preparation	Moderately prepared in advance	Well prepared in advance	Very well prepared in advance	
Participation (2)	Observes passively says nothing	Participates lets others provide direction	Actively participates in discussions and asks questions	Very actively participates in discussions and asks questions	
Research (2)	No documented research	Inadequate research and documentation	Thoroughly participates in research	work thoroughly researched and documented	
Level of interest (2)	attendance haphazard and inconsistent late absent	If likely to be absent or late informs others ahead of time	Carries own share of the groups responsibilities	Volunteers willingly and carries share of the groups responsibilities	
Communication (2)	Work is illegible disorganized hard to follow	Work has several inconsistencies and is somewhat organized	work is generally organized	Work is well organized and presented	
Overall Performance	**Unacceptable**	**Marginal**	**Acceptable**	**Exceptional**	**Total**
	0-6	**7-14**	**15-22**	**23-30**	

II. Follow-up (closing the loop) on results and activities from previous assessment cycles. In this section, please describe actions taken during this cycle that were based on, or implemented to address, the results of assessment from previous cycles.

A. What SLO(s) did you address? Please include the outcome(s) verbatim from the assessment plan.	B. When was this SLO last assessed? Please indicate the semester and year.	C. What were the recommendations for change from the previous assessment?	D. Were the recommendations for change acted upon? If not, why?	E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations?
e. Function effectively as members or leaders of a technical team	Fall 2015 & Spring 2016	The department chair strongly encouraged the dean to plan for another full-time tenure track professor to lead this course for future years.	Difficulty in obtaining valid reliable data was apparent in the previous cycle of evaluation. The inconsistency of full-time faculty was a problem. The department chair made a strong effort to retain previous successful adjunct faculty and strengthen their knowledge of the role and mission of program.	While the number of adjunct faculty remained high a strong effort was made to retain previous success adjunct faculty was made. Preliminary results show consistency in the use of consistent assessment tools. The results of the Student Learning Outcome proved to be equal or slightly lower than the previous year. However, the results are within the expectations. This evaluator feels confident with the results and consistence of the assessment.
g. Communicate effectively regarding subjects related to engineering technology	Fall 2015 & Spring 2016	The department chair strongly encouraged the dean to plan for another full-time tenure track professor	Difficulty in obtaining valid reliable data was apparent in the previous cycle of evaluation. The inconsistency	While the number of adjunct faculty remained high a strong effort was made to retain previous success adjunct faculty was made.
E. Plan and Prepare appropriate to design and construction	Fall 2015 & Spring 2016	The department chair strongly encouraged the dean to plan for another full-time tenure track professor	Difficulty in obtaining valid reliable data was apparent in the previous cycle of evaluation. The inconsistency	While the number of adjunct faculty remained high a strong effort was made to retain previous success adjunct faculty was made.