Academic Program Assessment Report for AY 2017-2018 **Program:**_Civil Engineering Technology _____

(Due: June 1, 2018) **Date report completed:** _____May 30, 2018_

Completed by:_____Michael Mincic_____

Assessment contributors (other faculty involved): ____MD Islam, Kevin Sparks_____

Please describe the 2017-2018 assessment activities and follow-up for your program below. Please complete this form for each undergraduate major, minor, certificate, and graduate program (e.g., B.A., B.S., M.S.) in your department. Please copy any addenda (e.g., rubrics) and paste them in this document, save and submit it to both the Dean of your college/school and to the Assistant Provost as an email attachment before June 1, 2018. You'll also find this form on the assessment website at https://www.csupueblo.edu/assessment-and-student-learning/resources.html. Thank you.

I. Assessment of Student Learning Outcomes (SLOs) in this cycle. Including processes, results, and recommendations for improved student learning. Use Column H to describe improvements planned for 2018-2019 based on the assessment process.

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? (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 that level?	F. What were the results of the assessment? Include the proportion of students meeting proficiency.	G. What were the department's conclusions about student performance?	H. What changes/improvements to the program are planned based on this assessment?
a. apply knowledge, techniques, skills, and tools of the civil engineering discipline to engineering	Spring 2013	• Problem statement shows understanding of the problem • Solution procedure and	CET 202 class 18 students	75% will attain 75%	- 61% attained 75%	The instructor will be advised by the program chair to revise his lecture content and lecture style.	Intructor will work with program chair to enhance teaching methods and possibly integrate skill building modules possibly through Blackboard. In the next assessment cycle, the improvement trend will be especially observed and

technology activities,		methods are defined. Problem solution is appropriate and within reasonable constraints (See attached anaylsis)					possible remedy will be discussed in a program meeting.
b. select and apply a knowledge of mathematics, science, engineering, and technology to civil engineering technology problems	Fall 2013 & Spring 2014	☐ Chooses a mathematical model of a system or process appropriate for required accuracy ☐ Applies mathematical principles to achieve analytical or numerical solution to model equations ☐ Examines approaches to solving an engineering technology problem to choose the more effective approach (See attached anaylsis)	CET 405 Class 23 Students	-75% will attain 75%	- 87% attained 75%	As the target is met, nothing has been done now.	In the next assessment cycle, the improvement trend will be observed and continuous improvement will be expected.
c. conduct standard tests and measurements ; analyze and interpret experimental	Fall 2013 & Spring 2014	☐Observes good lab practice and operates instrumentation with ease ☐ Determines data that are appropriate to collect and selects appropriate	CET 102 Class 31 Students	-75% will attain 75%	- 84% attained 75%	As the target is met, nothing has been done now.	In the next assessment cycle, the improvement trend will be observed and continuous improvement will be expected.

data; and apply experimental results to improve processes		equipment, protocols, etc. for measuring the appropriate variables to get required data ☐ Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics (See attached anaylsis)					
A. utilize principles and appropriate technology to produce drawings, reports, quantity estimates, and other documents related to civil engineering;	Fall 2013	☐Selects appropriate techniques and tools for a specific engineering technology task and compares results with results from alternative tools or techniques ☐Uses computer based and other resources effectively in assignments and projects (See attached anaylsis)	CET 473 17 Students	-75% will attain 75%	- 63% attained 75%	As the target is not met, the instructor will be advised by the program chair to revise his lecture content and lecture style.	Intructor will work with program chair to enhance teaching methods and possibly integrate skill building modules possibly through Blackboard. In the next assessment cycle, the improvement trend will be especially observed and possible remedy will be discussed in a program meeting.
B. conduct standardized field and laboratory tests related to	Spring 2014	☐Observes good lab practice and operates instrumentation with ease ☐ Determines	CET 315 Class 14 student Reports	-75% will attain 75%	- 100% attained 75%	All students attained at 75% or more, which is good for this	No actions

civil engineering		data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data ☐ Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error (See attached anaylsis)				outcome.	

Comments on part I: Please see the attached distributions and analysis of afore mentioned outcomes.

II. Closing the Loop. Describe at least one data-informed change to your curriculum during the 2017-2018 cycle. These are those 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)**	B. When was this SLO last assessed to generate the data which informed the	C. What were the recommendations for change from the previous assessment?	D. How were the recommendations for change acted upon?	E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations?

verbatim from the assessment plan.	change? Please indicate the semester and year.			
(f) identify, analyze, and solve broadly defined engineering technology problems,	Fall 2016 and 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%	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	Higher number of seniors are taking the FE (Fundamentals of Engineering) Prep course. Faculty in CET 404,405,412 and 415 were encouraged to increase problem solving assignments. Students are successfully completing the FE on the first attempt.

Comments on part II:

The Fundamentals of Engineering Exam (FE) is a national exam recognized by all 50 states in the US. Upon successful completion of the exam the candidate (student) receives designation as a Entingeering Intern. Candidates can only sit for the exam after having completed a board approved BS degree or being designated as senior status. The candidate is required to pally for the examination through the state board of registrations. The exam serves as one of the required steps toward licensure as a professional engineer (PE) in most US states. The PE is required to successfully complet the FE exam and then practice under a licensed professional engineer for board determined stutatory period. Recent changes in the examination process allow the student take the exam at a board approved location at their own time. As of the time of this report only a few students have taken the exam. While the exam is not requirement of the CSU Pueblo CET program it is hoghly recommended. Of the students who have taken the exam since the recommndations to the fauclty and this passed assessment all have reported passing the exam on tier first attempt. We are also a larger percentage of the graduating or senior status students taking the exam, We are also recognizing more students taking advantage to FE prep course as part of the elective requirements.

Colorado State University – Pueblo Academic Program Assessment Report for AY 2017-2018

Program: Bachelor of Science in Civil Engineering Technology (BSCET) **Date:** May 29, 2018

Completed by: Dr. MD Islam and Professor Michael A. Mincic

Assessment contributors (other faculty involved in this program's assessment): Dr. Islam and Mr. Sparks

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 2017-2018 assessment activities for the program in Part I. Use Column H to describe improvements planned for 2017-2018 based on the assessment process. In Part II, please describe

Assessment of Student Outcomes
2017-2018

In the Academic Year (AY) 2017-2018, the Student General Outcomes (a), (b), and (c) assessment has been assessed. This three outcomes has been selected as of our plan as shown in **Table 1.**

Table 1. Assessment Cycle for AY 2017-2018 to AY 2022-2023 for General Student Outcomes

Student Outcome	2017-2018	2018-2019	2019-2010	2020-2021	2021-2022	2022-2023
a. An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities	X			X		
b. An ability to select and apply a knowledge of mathematics, science, engineering and technology to engineering technology problems that require the application of principles and applied procedures or methodologies	X			X		
c. An ability to conduct standard tests and measurements; to conduct, analyze and interpret experiments; and to apply experimental results to improve processes	X			X		
d. An ability to design systems, components, or processes for broadly defined engineering technology problems appropriate to program educational objectives		X			X	
e. An ability to function effectively as a member or leader on a technical team		X			X	
f. An ability to identify, analyze and solve broadly-defined engineering technology problems		X			X	
g. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature		X			X	
h. An understanding of the need for and ability to engage in self-directed continuing professional development			X			X
i. An understanding of and commitment to address professional and ethical responsibilities including a respect for diversity			X			X
j. A knowledge of the impact of engineering technology solutions			X			X

in a societal and global context						
k. A commitment to quality, timeliness, and continuous improvement			X			X

Each table represents the activity for the current ABET accreditation cycle. Each outcome table includes performance indicators, courses and/or co-curricular activities (educational strategies) that provide students an opportunity to demonstrate the indicator, where summative data are collected, timetable, method of assessment and the performance target. Each table is followed by a graph showing the results for each outcome.

Student General Outcome (a). An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities

Table 2 lists the assessment for Student General Outcome (a). Then, an evaluation item, Final Exam, has been selected which best simulates the outcomes. The exam was scored based on the performance indicators listed. In general, the program target is 75% students will attain at least 75% score in the item to consider for the assessment.

Table 2. Assessment of Student General Outcome (a)

Performance Indicators	Educational Strategies	Random Sample	Semester	Target and Result

• Problem statement shows understanding of the problem • Solution procedure and methods are defined. • Problem solution is appropriate and within reasonable constraints	CET 102, 103, 202, 208, 305, 315, 317, 372, 404, 405, 412, 415, 455, 456, 473, 475	Final Exam of CET 202; Closed-book, written exam Every 3 years	Fall 2017	-75% will attain 75% - 61% attained 75%

Results for each student outcome are reported separately in the following tables and all supporting documentation will be available if asked. The rubric to evaluate students' work is presented in **Table 3**. Four criteria are generally used to make the evaluation simple and effective.

Table 3. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Problem statement shows understanding of the problem	100%	75%	50%	0%
Solution procedure and methods are defined.	100%	75%	50%	0%
Problem solution is appropriate and within reasonable constraints	100%	75%	50%	0%

Figure 1 shows that score distribution in the Final Exam of CET 202. A total of 61% students attained at least 75%. As the target is not met, the instructor will be advised by the program chair to revise his lecture content and lecture style. In the next assessment cycle, the improvement trend will be especially observed and possible remedy will be discussed in a program meeting.

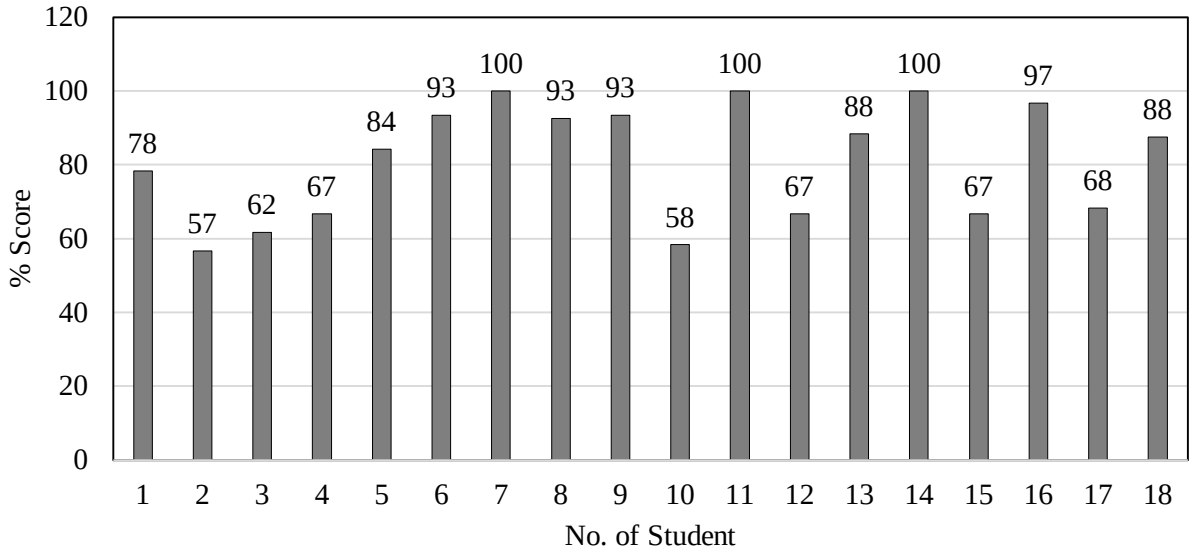

Figure 1. Score Distribution in the Final Exam of CET 202 for the Assessment of Student General Outcome (a)

Student General Outcome (b). An ability to select and apply a knowledge of mathematics, science, engineering and technology to engineering technology problems that require the application of principles and applied procedures or methodologies

Table 4 lists the assessment for Student General Outcome (b). Then, an evaluation item, Final Exam, has been selected which best simulates the outcomes. The exam was scored based on the performance indicators listed. In general, the program target is 75% students will attain at least 75% score in the item to consider for the assessment.

Table 4. Assessment of Student General Outcome (b)

Performance Indicators	Educational Strategies	Method, Where Data are Collected and Cycle Length	Semester	Target and Result
☐ Chooses a mathematical model of a system or process appropriate for required accuracy ☐ Applies mathematical principles to achieve analytical or numerical solution to model equations ☐ Examines approaches to solving an engineering technology problem to choose the more effective approach	CET 102, 103, 115, 116, 202, 206, 207, 208, 222, 226, 305, 315, 316, 317, 372, 404, 405, 412, 415, 456, 473, 475	Final Exam: Closed-book, written exam CET 405 Every 3 year	Fall 2017	-75% will attain 75% - 87% attained 75%

Table 5. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Chooses a mathematical model of a system or process appropriate for required accuracy	100%	75%	50%	0%
Applies mathematical principles to achieve analytical or numerical solution to model equations	100%	75%	50%	0%
Examines approaches to solving an engineering technology problem to choose the more effective approach	100%	75%	50%	0%

Figure 2 shows that score distribution in the Final Exam of CET 405. A total of 87% students attained at least 75%. As the target is met, nothing has been done now. In the next assessment cycle, the improvement trend will be observed and continuous improvement will be expected.

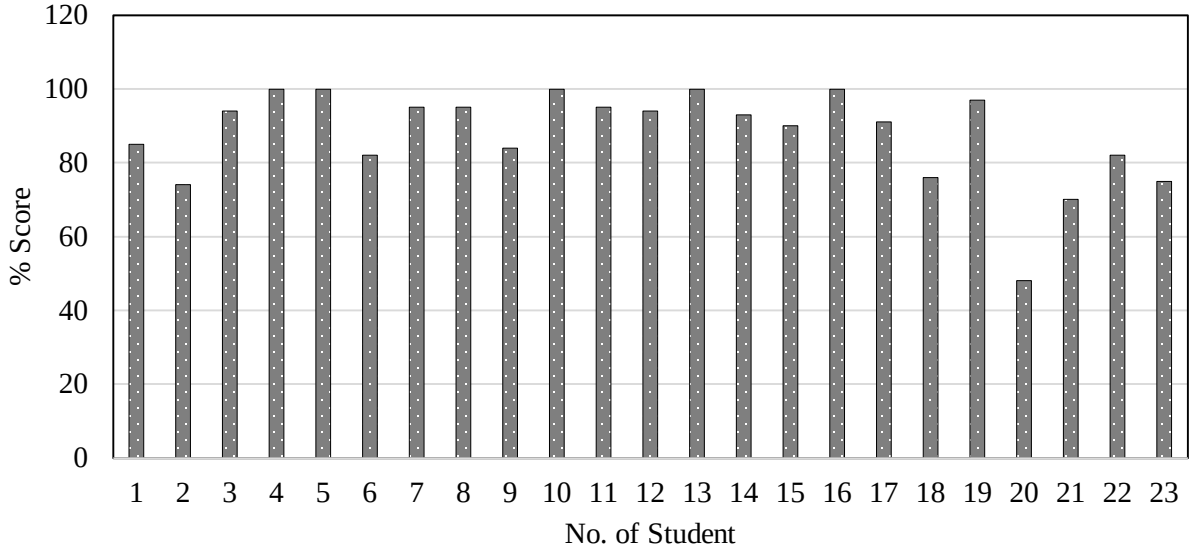

Figure 2. Score Distribution in the Final Exam of CET 405 for the Assessment of Student General Outcome (b)

Student General Outcome (c). An ability to conduct standard tests and measurements; to conduct, analyze and interpret experiments; and to apply experimental results to improve processes

Table 6. Assessment of Student General Outcome (c)

Performance Indicators	Educational Strategies	Method, Where Data are Collected and Cycle Length	Semester	Target and Result
☐Observes good lab practice and operates instrumentation with ease ☐ Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data ☐ Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	CET 102, 103, 208, 315, 317	A field survey and its report from CET 102 Every 3 year	Fall 2017	-75% will attain 75% - 84% attained 75%

Table 7. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Observes good lab practice and operates instrumentation with ease	100%	75%	50%	0%
Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data	100%	75%	50%	0%
Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	100%	75%	50%	0%

Figure 3 shows that score distribution in a field survey exercise score in CET 103. A total of 84% students attained at least 75%. As the target is met, nothing has been done now. In the next assessment cycle, the improvement trend will be observed and continuous improvement will be expected.

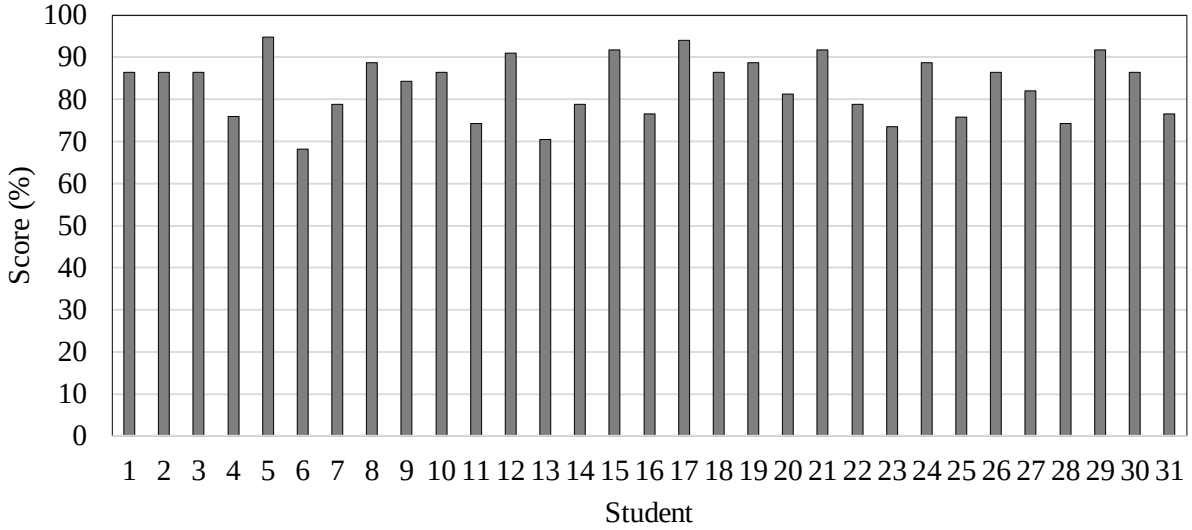

Figure 3. Score Distribution in the Field Survey Report of CET 103 for the Assessment of Student General Outcome (c)

The assessment of Specific Student Outcomes will be conducted on a three-year cycle starting from Academic Year (AY) 2017-2018 as shown in **Table 8.** This means the assessment cycle will be started in the fall of 2017 and end up in the spring of 2020. At the first AY of the cycle, Student Specific Outcomes (a), and (b) assessment will be conducted. In the following AY, Student Specific Outcomes (c), (d), and (e) will be assessed. In the final AY of the cycle, the last four Student Specific Outcomes (f), (g), and (h) will be assessed. Then all the Student Specific Outcomes assessment will be completed in a three-year cycle. After that this process will be repeated from AY 2020-2021.

Table 8. Assessment Cycle for AY 2017-2018 to AY 2022-2023 for Specific Student Outcomes

Student Outcome	2017-2018	2018-2019	2019-2010	2020-2021	2021-2022	2022-2023
a. Utilize principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;	X			X		
b. Conduct standardized field and laboratory tests related to civil engineering;	X			X		
c. Utilize surveying methods appropriate for land measurement and/or construction layout;		X			X	
d. Apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to civil engineering.		X			X	
e. Plan and prepare documents appropriate for design and construction;		X			X	
f. Perform economic analyses and cost estimates related to design, construction, operations and maintenance of systems associated with civil engineering;			X			X
g. Select appropriate engineering materials and practices, and;			X			X
h. Perform standard analysis and design in at least three sub-disciplines related to civil engineering.			X			X

Student Specific Outcome (a). Utilize principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;

Table 9 lists the assessment for Student Specific Outcome (a). Then, an evaluation item, a homework requiring usage of a software, has been selected which best simulates the outcomes. The exam was scored based on the performance indicators listed. In general, the program target is 75% students will attain at least 75% score in the item to consider for the assessment.

Table 9. Assessment of Student Specific Outcome (a)

Performance Indicators	Educational Strategies	Method, Where Data are Collected and Cycle Length	Semester	Target and Result
☐Selects appropriate techniques and tools for a specific engineering technology task and compares results with results from alternative tools or techniques ☐Uses computer-based and other resources effectively in assignments and projects	CET 102, 103, 115, 116, 207, 208, 315, 317, 404, 405, 473	HW on Software CET 473 Every 3 year	Spring 2018	-75% will attain 75% - 63% attained 75%

Table 10. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Selects appropriate techniques and tools for a specific engineering technology task and compares results with results from alternative tools or techniques	100%	75%	50%	0%
Uses computer-based and other resources effectively in assignments and projects	100%	75%	50%	0%

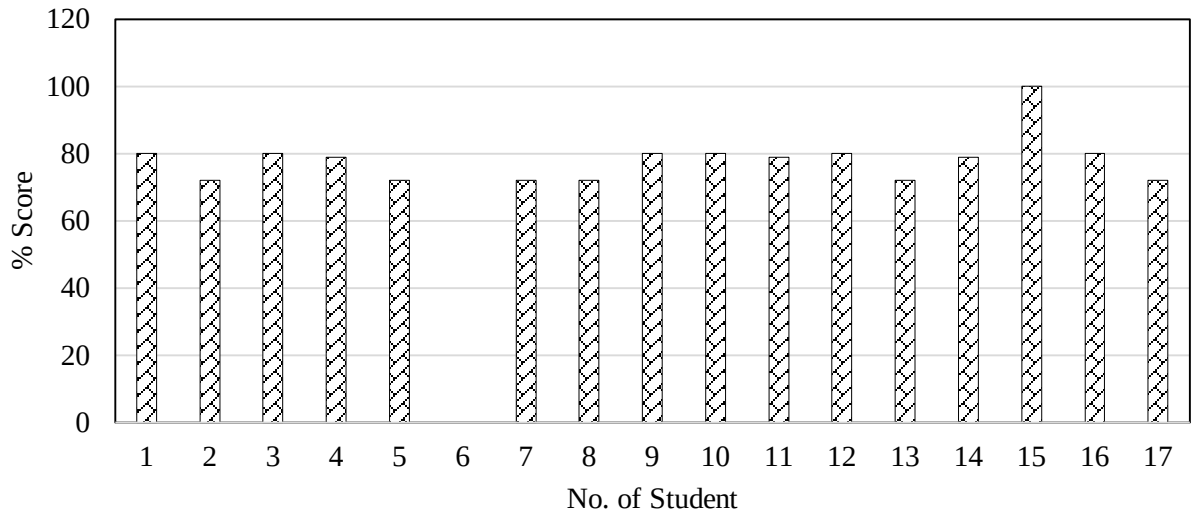

Figure 4. Score Distribution in a Software-related Homework in CET 473 for the Assessment of Student Specific Outcome (a)

Figure 4 shows that score distribution in the Final Exam of CET 473. A total of 63% students attained at least 75%. As the target is not met, the instructor will be advised by the program chair to revise his lecture content and lecture style. In the next assessment cycle, the improvement trend will be especially observed and possible remedy will be discussed in a program meeting.

Student Specific Outcome (b). Conduct standardized field and laboratory tests related to civil engineering;

Table 11. Assessment of Student Specific Outcome (b)

Performance Indicators	Educational Strategies	Method, Where Data are Collected and Cycle Length	Semester	Target and Result
☐Observes good lab practice and operates instrumentation with ease ☐ Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data ☐ Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	CET 206, 206, 315, 317	Lab report of CET 315 Every 3 year	Spring 2018	-75% will attain 75% - 100% attained 75%

Table 12. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Observes good lab practice and operates instrumentation with ease	100%	75%	50%	0%
Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data	100%	75%	50%	0%
Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	100%	75%	50%	0%

Figure 5 shows that score distribution in a laboratory exercise score in CET 315. All students attained at 75% or more, which is good for this outcome.

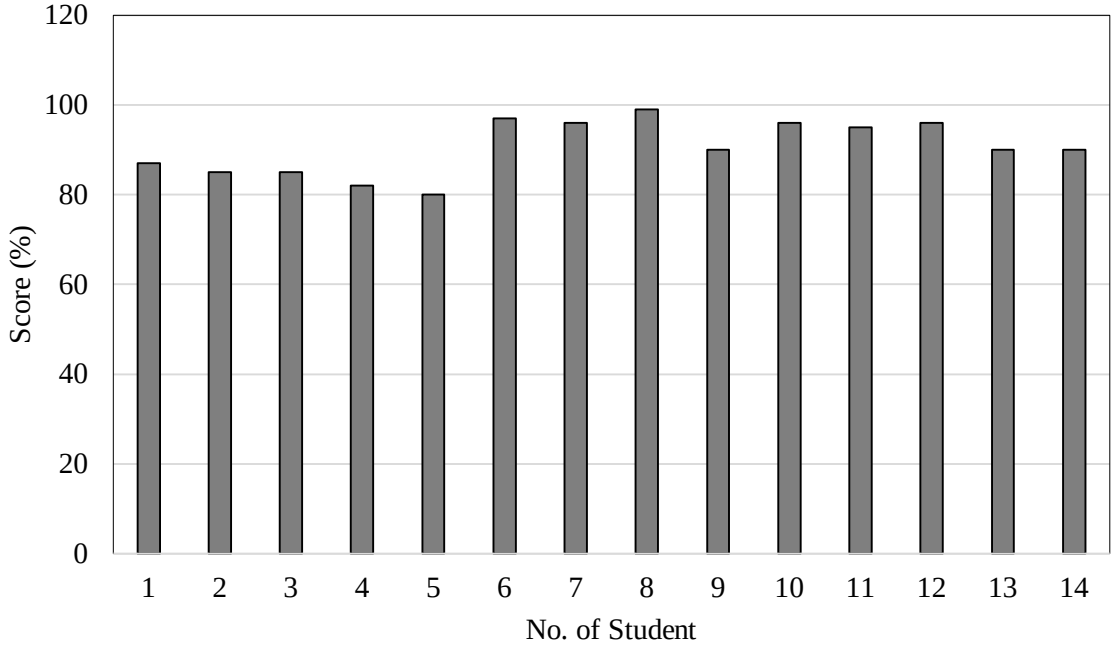

Figure 5. Score Distribution in a Lab Exercise Report in CET 315 for the Assessment of Student Specific Outcome (b)

Spring 2018 Assessment of Student Outcomes
2017-2018

In the Academic Year (AY) 2017-2018, the Student General Outcomes (a), (b), and (c) assessment have been assessed. During the Spring of 2018 the CET faculty engaged in an effort to enhance the assessment process by evaluating the assessment materials against a set of performance indicators. The faculty was engaged in adding the performance indicators to the syllabus for the specific course. The following assessment results are using said performance indicators. These three outcomes have been selected as of our plan as shown in **Table 1.**

Table 1. Assessment Cycle for AY 2017-2018 to AY 2022-2023 for General Student Outcomes

Student Outcome	2017-2018	2018-2019	2019-2010	2020-2021	2021-2022	2022-2023
l. An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities	X			X		
m. An ability to select and apply a knowledge of mathematics, science, engineering and technology to engineering technology problems that require the application of principles and applied procedures or methodologies	X			X		
n. An ability to conduct standard tests and measurements; to conduct, analyze and interpret experiments; and to apply experimental results to improve processes	X			X		
o. An ability to design systems, components, or processes for broadly defined engineering technology problems appropriate to program educational objectives		X			X	
p. An ability to function effectively as a member or leader on a technical team		X			X	
q. An ability to identify, analyze and solve broadly-defined engineering technology problems		X			X	
r. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature		X			X	
s. An understanding of the need for and ability to engage in self-directed continuing professional development			X			X
t. An understanding of and commitment to address professional and ethical responsibilities including a respect for diversity			X			X
u. A knowledge of the impact of engineering technology solutions in a societal and global context			X			X
v. A commitment to quality, timeliness, and continuous improvement			X			X

The outcome-wise assessment details are presented now. Each outcome table includes performance indicators, courses and/or co-curricular activities (educational strategies) that provide students an opportunity to demonstrate the indicator, where summative data are collected, timetable, method of assessment and the performance target. Each table is followed by a graph showing the results for each outcome, and action activities.

Student General Outcome (a). An ability to select and apply the knowledge, techniques, skills and modern tools of the discipline to broadly-defined engineering technology activities

Table 2 lists the assessment for Student General Outcome (a). Then, an evaluation item, Final Exam of CET 404, has been selected which best simulates the outcomes. The program target is 75% students will attain at least 75% score in the item to be considered for the assessment.

Table 2. Assessment of Student General Outcome (a)

Performance Indicators	Educational Strategies	Random Sample	Semester	Target and Result
• Problem statement shows understanding of the problem • Solution procedure and methods are defined. • Problem solution is appropriate and within reasonable constraints	CET 102, 103, 202, 208, 305, 315, 317, 372, 404, 405, 412, 415, 455, 456, 473, 475	Final Exam of CET 404; Open-book, written exam	Spring 2018	-75% will attain 75% - 83% attained 75%

Results for each student outcome are reported separately in the following tables and all supporting documentation will be available if asked. The rubric to evaluate students' work is presented in **Table 3**. Three performance indicators are generally used to make the evaluation simple but effective.

Table 3. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Problem statement shows understanding of the problem	100%	75%	50%	0%
Solution procedure and methods are defined.	100%	75%	50%	0%
Problem solution is appropriate and within reasonable constraints	100%	75%	50%	0%

Figure 1 shows that score distribution in the Final Exam of CET 404. A total of 83% students attained at least 75%. As the target is met, no immediate action has been at this point. Still though this result will be discussed in the upcoming departmental meeting to find out how this achievement can be maintained in future, and to discuss how to improve continuously.

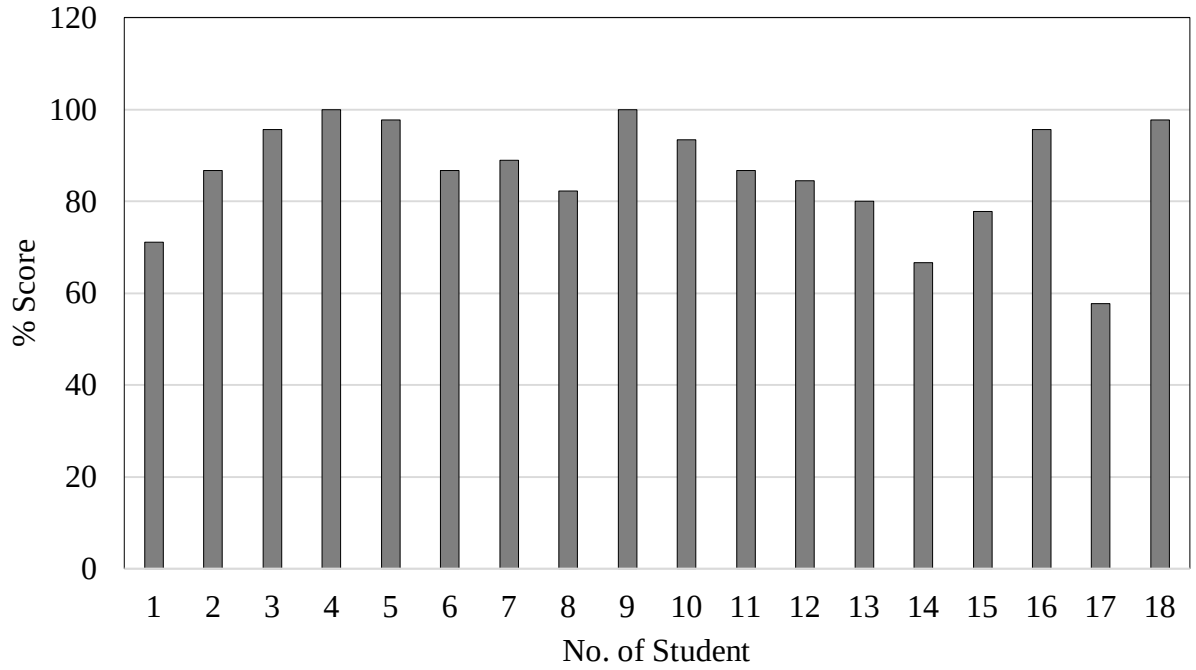

Figure 1. Score Distribution in the Final Exam of CET 404 for the Assessment of Student General Outcome (a)

Student General Outcome (b). An ability to select and apply a knowledge of mathematics, science, engineering and technology to engineering technology problems that require the application of principles and applied procedures or methodologies

Table 4 lists the assessment for Student General Outcome (b). Then, an evaluation item, Hourly Exam of CET 372, has been selected which best simulates the outcomes. Hourly Exam means an exam that lasts approximately one hour and is held during the class period. The exam was scored based on the performance indicators listed. The rubrics presented in **Table 5** has been used to score the answer scripts. In general, the program target is 75% students will attain at least 75% score in the item to consider for the assessment.

Table 4. Assessment of Student General Outcome (b)

Performance Indicators	Educational Strategies	Method, Where Data are Collected and Cycle Length	Semester	Target and Result
☐ Chooses a mathematical model of a system or process appropriate for required accuracy ☐ Applies mathematical principles to achieve analytical or numerical solution to model equations ☐ Examines approaches to solving an engineering technology problem to choose the more effective approach	CET 102, 103, 115, 116, 202, 206, 207, 208, 222, 226, 305, 315, 316, 317, 372, 404, 405, 412, 415, 456, 473, 475	Hourly Exam, open-book, written exam CET 372	Spring 2018	-75% will attain 75% - 80% attained 75%

The rubrics presented in **Table 5** has been used to score the answer scripts.

Table 5. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Chooses a mathematical model of a system or process appropriate for required accuracy	100%	75%	50%	0%
Applies mathematical principles to achieve analytical or numerical solution to model equations	100%	75%	50%	0%
Examines approaches to solving an engineering technology problem to choose the more effective approach	100%	75%	50%	0%

Figure 2 shows that score distribution in an Exam of CET 372. A total of 80% students attained at least 75%. As the target is met, nothing has been done now, but this result will be discussed in the next departmental meeting to find out how to maintain this achievement and how to improve continuously. In the next assessment cycle, the improvement trend will be observed and continuous improvement will be expected.

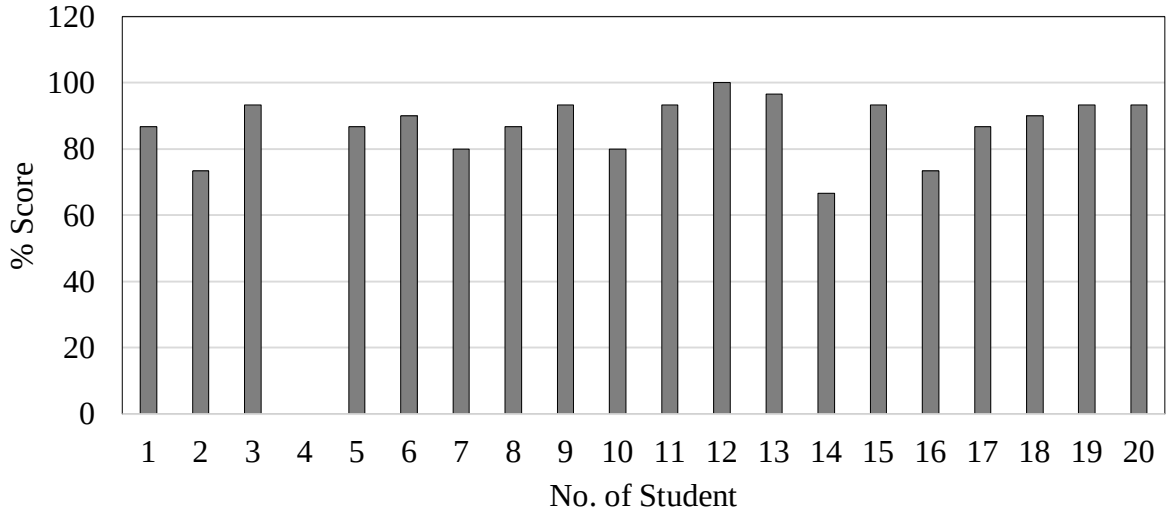

Figure 2. Score Distribution in an Exam of CET 372 for the Assessment of Student General Outcome (b)

Student General Outcome (c). An ability to conduct standard tests and measurements; to conduct, analyze and interpret experiments; and to apply experimental results to improve processes

Table 6 lists the assessment for Student General Outcome (c). Then, an evaluation item, laboratory report from CET 315, has been selected which best simulates the outcomes. The exam was scored based on the performance indicators listed. The rubrics presented in **Table 7** has been used to score the answer scripts. In general, the program target is 75% students will attain at least 75% score in the item to consider for the assessment.

Table 6. Assessment of Student General Outcome (c)

Performance Indicators	Educational Strategies	Method, Where Data are Collected and Cycle Length	Semester	Target and Result

☐Observes good lab practice and operates instrumentation with ease ☐ Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data ☐ Uses appropriatetools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	CET 102, 103, 208, 315, 317	Lab report of CET 315	Spring 2018	-75% will attain 75% - 100% attained 75%

Table 7. Grading Rubric for Different Performance Indicators

	Good	Fair	Poor	Unable
Observes good lab practice and operates instrumentation with ease	100%	75%	50%	0%
Determines data that are appropriate to collect and selects appropriate equipment, protocols, etc. for measuring the appropriate variables to get required data	100%	75%	50%	0%
Uses appropriate tools to analyze data and verifies and validates experimental results including the use of statistics to account for possible experimental error	100%	75%	50%	0%

Figure 3 shows that score distribution in a laboratory exercise score in CET 315. All students attained at 75% or more, which is good for this outcome. As the target is met, nothing has been done now, but this result will be discussed in the next departmental meeting to find out how to maintain this achievement and how to improve continuously. In the next assessment cycle, the improvement trend will be observed and continuous improvement will be expected.

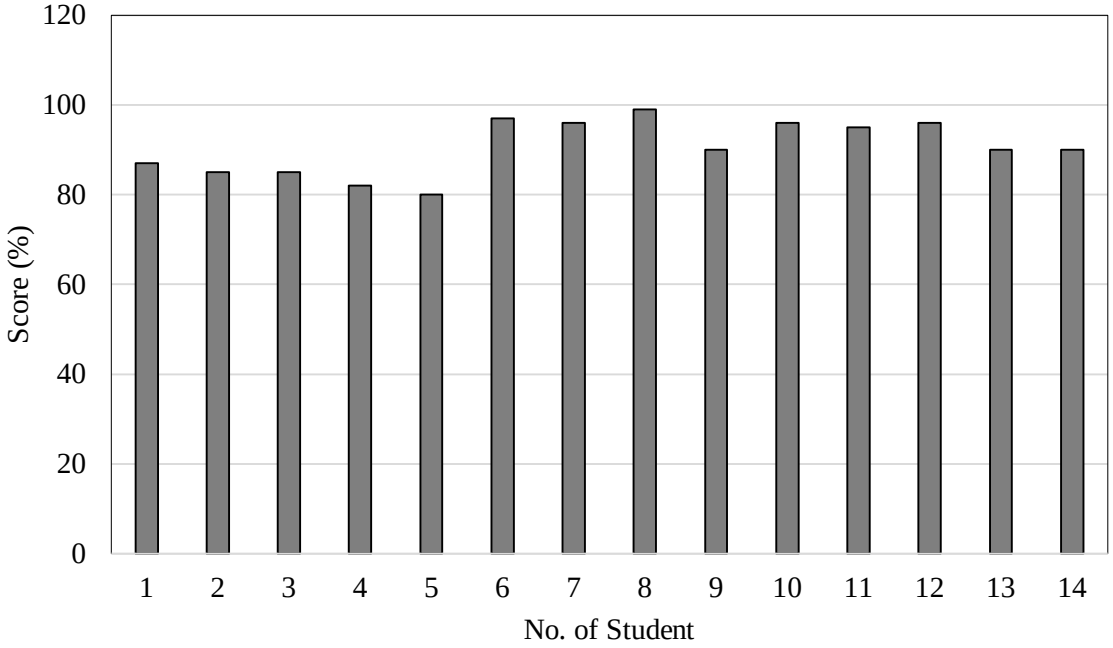

Figure 3. Score Distribution in a Lab Exercise Report in CET 315 for the Assessment of Student Specific Outcome (b)