SAINT LOUIS UNIVERSITY.

Program-Level Assessment: Annual Report

Program: Civil Engineering	Department: School of Engineering
Degree or Certificate Level: Bachelor of Science	College/School: Parks College of Engineering, Aviation & Technology
Date (Month/Year): October/2020	Primary Assessment Contact: Dr. Chris Carroll

In what year was the data upon which this report is based collected? 2019/2020

In what year was the program's assessment plan most recently reviewed/updated? 2019/2020

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle?

3) An ability to communicate effectively with a range of audiences.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

9) An ability to explain basic concepts in management, business, public policy, and leadership.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please identify the course(s) in which these artifacts were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

3) An ability to communicate effectively with a range of audiences.

CVNG 3020 – Final Project Oral Presentation and Report

CVNG 3140 – Water Resources and Entrepreneurship Presentation

CVNG 4500 – Capstone Preliminary Design Alternatives Project Presentation and Report

CVNG 4510 – Capstone Final Design Project Presentation and Report

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

CVNG 3030 – Fiber-reinforced Concrete Bowling Ball Project

CVNG 3041 – Total carbonate and non-carbonate hardness of tap water laboratory

CVNG 3100 – Hydraulic conductivity of soils laboratory

CVNG 3140 – Pump characteristics curves laboratory

9) An ability to explain basic concepts in management, business, public policy, and leadership.

CVNG 3040 – Homework problem on climate change

CVNG 3070 – Graded assignment on project management

CVNG 3070 – Exam question on project management

CVNG 3100 – Consolidation lab with project management focus

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and include them in/with this report.

3) An ability to communicate effectively with a range of audiences.

Outcome 3 was assessed using seven different assignments in four different courses. Two courses cover two specific sub-disciplines, while the third and fourth are the culminating capstone experiences. Those four courses are CVNG 3020—Structural Analysis Lab, CVNG 3140—Hydraulics Engineering Lab, CVNG 4500—Capstone Design I, and CVNG 4510—Capstone Design II. The instructor of each respective course completed the preliminary assessment using the attached rubrics.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

Outcome 6 was assessed using four different assignments/projects in four different courses that cover four respective sub-disciplines within civil engineering that all focus on laboratory experiments including the analysis and interpretation of data. Those four courses are CVNG 3030—Civil Engineering Materials, CVNG 3041—Sustainability and Environmental Engineering Lab, CVNG 3100—Geotechnical Engineering Lab, and CVNG 3140—Hydraulic Engineering Lab. The instructor of each respective course completed the preliminary assessment using the attached rubrics.

9) An ability to explain basic concepts in management, business, public policy, and leadership.

Outcome 9 was assessed using four different assignments/lab experiments/exams in three different courses that cover three respective sub-disciplines within civil engineering that include project management, business, public policy, and leadership characteristics. Those three courses were CVNG 3040—Sustainability and Environmental Engineering, CVNG 3070—Project Management, and CVNG 3100—Geotechnical Engineering Lab. The instructor of each respective course completed the preliminary assessment using the attached rubrics.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

3) An ability to communicate effectively with a range of audiences.

Five of the assessment measures successfully met the benchmark of 80% for rubric score. One of the assessment measures nearly met the benchmark based on rubric score, which was only the result of poor visuals used in one presentation. One of the assessment measures was not used in the spring 2020 semester due to the COVID-19 pandemic. While the assessment measures associated with this outcome nearly all met the benchmark, there were some suggestions for improvement related to developing presentations skills earlier in the curriculum.

Outcome 3 Assessment Results Summary

Course	CVNG 3020		CVNG 3140	CVNG 4500		CVNG 4510	
Assess. Tool	Final Project Presentation and Report		*Water Resources and Entrepreneurship Presentation	Preliminary Design Alternatives Project Presentation and Report		Final Design Project Presentation and Report	
	Oral Presentation	Written Report	Oral Presentation	Oral Presentation	Written Report	Oral Presentation	Written Report
Scoring	Rubric Score	Rubric Score	Rubric Score	Rubric Score	Rubric Score	Rubric Score	Rubric Score
Average	2.00	2.00		2.07	2.29	2.27	2.36
SD	0.65	0.65		0.21	0.46	0.29	0.42
High	3.00	3.00		2.25	3.00	2.75	3.00
Median	2.00	2.00		2.25	2.00	2.13	2.00
Low	1.00	1.00		1.75	2.00	2.00	2.00
Target	2	2		2	2	2	2
≥ 2	12	12		16	21	21	21
< 2	3	3		5	0	0	0
% ≥ 2	**80**	**80**		**76.2**	**100**	**100**	**100**
Status	**Met**	**Met**	**N/A**	**Not Met**	**Met**	**Met**	**Met**

*Data for this assessment measure was not available for the spring 2020 semester as a result of the COVID-19 pandemic.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

Three of the assessment measures successfully met the benchmark of 80% for both raw score and rubric score. However, one of the assessment measures did not successfully meet the benchmark of 80% for rubric score. The evaluator noted the suspected root cause of the undesirable results and provided suggested changes to improve student performance and comprehension of the respective topic.

Outcome 6 Assessment Results Summary

Course	CVNG 3030		CVNG 3041		CVNG 3100		CVNG 3140	
Assess. Tool	Fiber-reinforced Concrete Bowling Ball Project		Total Carbonate and Non-carbonate Hardness of Tap Water Laboratory		Compaction Laboratory		Pump Characteristics Curve Laboratory	
Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
Average	98.55	1.17	9.65	2.68	85.88	2.00	93.00	2.33
SD	1.18	0.38	0.32	0.48	4.41	0.00	4.05	0.78
High	100.00	2.00	10.00	3.00	90.00	2.00	99.00	3.00
Median	99.00	1.00	9.50	3.00	85.00	2.00	92.50	2.50
Low	97.00	1.00	9.30	2.00	80.00	2.00	87.00	1.00
Total Pts	100		10		100		100	
≥ 70%	18		19		17		12	
< 70%	0		0		0		0	
% ≥ 70%	**100**		**100**		**100**		**100**	
Target		2		2		2		2
≥ 2		3		19		17		10
< 2		15		0		0		2
% ≥ 2		**16.7**		**100**		**100**		**83.3**
Status	**Met**	**Not Met**	**Met**	**Met**	**Met**	**Met**	**Met**	**Met**

9) An ability to explain basic concepts in management, business, public policy, and leadership.

All of the assessment measures successfully met the benchmark of 80% percent for both raw score and rubric score.

Outcome 9 Assessment Results Summary

Course	CVNG 3040		CVNG 3070		CVNG 3070		CVNG 3100	
Assess. Tool	Homework Assignment on Climate Change and Sequestration		Graded Assignment on Project Management		Exam Question on Project Management		Consolidation Lab with Project Management Focus	
Scoring	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score	Raw Score	Rubric Score
Average	9.67	2.67	46.44	2.00	87.33	2.50	187.35	2.47
SD	0.52	0.52	3.13	0.00	8.60	0.62	2.57	0.51
High	10.00	3.00	50.00	2.00	96.00	3.00	190.00	3.00
Median	10.00	3.00	46.00	2.00	90.50	3.00	185.00	2.00
Low	9.00	2.00	40.00	2.00	62.00	1.00	185.00	2.00
Total Pts	10		50		100		200	
≥ 70%	6		18		17		17	
< 70%	0		0		1		0	
% ≥ 70%	**100**		**100**		**94.4**		**100**	
Target		2		2		2		2
≥ 2		6		18		17		17
< 2		0		0		1		0
% ≥ 2		**100**		**100**		**94.4**		**100**
Status	**Met**	**Met**	**Met**	**Met**	**Met**	**Met**	**Met**	**Met**

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

3) An ability to communicate effectively with a range of audiences.

Independent Faculty Review

1. Outcome 3 is assessed in several courses across the civil engineering curriculum using seven assignments evaluated by rigorous rubrics developed from the AAC&U value rubrics for written and oral communication. The assessment of this outcome stretches form the first formal presentation given within the civil engineering curriculum in CVNG 3020 to the culminating presentation associated with the final capstone design in CVNG 4510. One assignment was not assessed due to the COVID-19 pandemic. Five of the six assignments met the benchmark values of 80% receiving a rubric score of at least 2. It should be noted that the sixth assignment was at 76.2%.
2. Oral and written communication are assessed based on group work and students' individual skills are not assessed. Students mostly communicate with other students in their cohort and the civil engineering faculty. The range of individuals with which students communicate could be expanded to other cohorts. Students were also minimally prepared for virtual presentations and struggle with the use of visuals in their presentations.
3. There are several suggestions for improvement. Those suggestions include incorporating tutorials on effective presentation skills into the CVNG 3020 course and adding presentations skills to the Intro to Civil Engineering course. Other forms of assessment using virtual methods could also be incorporated. Furthermore, SLU is currently implementing a new CORE Curriculum university-wide, which will begin in the fall of 2021 that will include specific courses related to technical writing and presentations. Lastly, consideration should be given across the curriculum to incorporate the use of visual tools such as Autodesk REVIT and Civil 3D so students are prepared to use those tools to help convey their message.
4. The average rating for this outcome was a 3.5. The outcome was **moderately** to **mostly** met, but has some room for improvement.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

Independent Faculty Review

1. Outcome 6 was assessed in four courses covering four different sub-disciplines of civil engineering using various laboratory experiments. Hands-on learning is an integral part of the program and students conduct experiments in various courses on a regular basis. The outcome was clearly met in three of the four courses used for the assessment.
2. One of the four courses did not meet the established benchmark of 80%. The expectations for the particular assignment used for the assessment in CVNG 3030 needs be clearer to ensure students are analyzing and interpreting data to use engineering judgement to draw conclusions.
3. The suggested improvements to clarify the outlying assignment are adequate for this outcome.
4. The average rating for this outcome was a 4.0. The outcome was **mostly** met, but has some room for improvement.

9) An ability to explain basic concepts in management, business, public policy, and leadership.

Independent Faculty Review

1. Outcome 9 is covered using diverse formats through homework assignments, lab work, and exams. The outcome met the established benchmark values for all assessment measures. A particular strength is the coverage of project management and business aspects within the CVNG 3070 course and CVNG 3100 lab.
2. There are no critical program weaknesses identified in this outcome. However, it should be noted that this outcome is only assessed in the junior year. Furthermore, the leadership aspects of this outcome are not apparent in the assessment.
3. The results of the assessment are satisfactory and meet the benchmark values. There are no specific plans listed for improvement. However, there could be room for improvement regarding the leadership aspect of this outcome. Leadership could easily be incorporated within the Intro to Civil Engineering course, which would also spread this outcome across multiple years within the curriculum.
4. The average rating for this outcome was a 4. The outcome was **mostly** met and may have some room for improvement.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

Civil Engineering Program Meeting—ABET

Meeting Minutes

July 9, 2020, 1:00 pm - 2:50 pm, via Zoom

Attendance:
Present: Craig Adams, Chris Carroll, Amanda Cox, Riyadh Hindi, Jalil Kianfar, Ronaldo Luna
Absent: None
Visitors: Ray LeBeau (Parks College Assessment Coordinator)

1. **Meeting topic:** The topic of this meeting was focused on the Assessment Retreat portion of the Annual ABET Student Outcomes Assessment Process. The specific purpose was to evaluate the Faculty Review of each outcome and Develop a Plan of Action that addresses any weaknesses that were identified during the assessment and review processes.

2. **Review of Student Outcomes and Rubrics:** Dr. Carroll began the conversation with a brief overview of the Faculty Review process. Each faculty member was assigned to review specific outcomes and asked to answer the following questions that Dr. LeBeau suggested for the process:

   1) What are the critical program strengths identified in this outcome?
   2) What are the critical program weaknesses identified in this outcome?
   3) Are there suggested plans of action to improve the results of this outcome? If so, are they adequate?
   4) To what extent is the outcome met by the assessment measures on a scale of 1-5?
      (1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Mostly, 5 = Completely)

   Dr. Luna asked if the rubrics were written appropriately for the assessment process. Dr. Carroll noted that the intention was for each rubric to be written in the context of the outcomes and not written for "grading" an assignment. Thus, each rubric was reviewed by the faculty to ensure that was the case. Some rubrics will have small edits for the 2020-2021 academic year, but nearly all of the rubrics were deemed sufficient for the task at hand.

   Dr. Hindi noted that the plan of action and continuous improvement process should not only include what the faculty intends to do to make things better, but to also ensure other constituencies are involved in the continuous improvement process. He also noted that the independent review of outcomes is good, but it's important that other constituencies have the opportunity down the road to also review documentation. Dr. Carroll noted that an external review would occur two times during the six-year ABET cycle. Dr. Hindi further iterated the importance of including students in the continuous improvement process.

   Dr. Carroll shared a Google Doc for the Plan of Action that initially included the feedback from the Faculty Review along with the individual comments from the instructors of the courses regarding their anticipated improvements to address specific weaknesses resulting from the review. This was to jump-start the process and provide a draft document that everyone could edit as the meeting progressed through each outcome. Dr. Carroll also noted that the most frequent comment was that the suggested plans to improve each outcome needed additional information to clarify that process for the new academic year. Furthermore, some plans of action also include an "other" section that provides suggestions for continuous improvement for the program in general that go beyond the courses currently used to assess a specific outcome.

   The following sections summarize brief discussions and activities related to each outcome during the meeting.

   Outcome 3: The strength noted in the reviews was that we assess the student's communication skills continuously

over the course of two years during the junior and senior year (four consecutive semesters) in a variety of courses. Dr. Kianfar expanded on his review comment regarding our focus on group communication and not currently assessing individual communication skills. Students currently give individual presentations in the Transportation Engineering Lab, but we are not using that activity to assess individual students. Dr. Kianfar noted that he would be willing to assess that activity on an individual basis for the purpose of evaluating Outcome 3.

Dr. Carroll suggested the possibility of implementing similar requirements for individual presentations in the Freshman Engineering course both virtual and in person to ease freshmen into the process of giving oral presentations. Dr. Adams mentioned the importance for students to learn from listening to other students present. Dr. Cox also mentioned that elementary, middle, and high school students are giving more presentations and students are much better prepared when they arrive in college. Dr. Cox followed up with an idea that students could also post a recording of their presentation as proof that they practiced before giving the same presentation in person. Dr. Carroll followed with a comment that students could post their presentations and other students could be required to review and critique the presentations. Dr. Adams and Dr. Cox agreed that peer review of posted presentations would be beneficial to the students. Dr. Kianfar noted that Transportation Engineering Lab students provide peer review of other students via Qualtrics.

Dr. Carroll also noted the need for better visualization of design concepts used in presentations for the Capstone Course. He has discussed various options with Mr. Sean Martin (CVNG 1020 adjunct) and recently found a website called CADLearning, which provides economic options for students to self-learn various Autodesk programs using very well-structured tutorial videos. Dr. Carroll is looking at pricing options for individual subscriptions versus group pricing options for the program.

It was also noted that the University's new CORE curriculum will begin in the fall of 2021 and will include courses focused on oral, written, and visual communication, which will also indirectly impact Outcome 3.

Outcome 6: Dr. Cox noted that the students have very good lab skills, written communication skills, and teamwork skills. Dr. Cox created a template for her lab reports, which worked really well with the students and agreed to share her lab report guidelines with the faculty. . The students struggle with reports when they are not provided with a specific format. The faculty agreed to used similar lab report formats across the curriculum.

Dr. Luna noted significant variation among the students' calculations in the Capstone Design courses. He continued by noting that the students learn MathCAD during sophomore year and ask if we could develop a generic calculation template in addition to the lab report template that students could be introduced to during their freshman year. Additionally, Dr. Luna mentioned that many times problem statements, sketches, design criteria, and references are missing from calculation packages. Dr. Carroll also noted his frustration with students using hand sketches with no straight edges. Dr. Luna and Dr. Kianfar agreed to create a calculation template and Dr. Kianfar will introduce a calculation template in the CVNG 1500 course during the freshman year.

Outcome 9: The review of Outcome 9 was briefly discussed, but the meeting was coming to a close. The reviews noted that Outcome 9 was only addressed during the junior year and should be assessed at other levels. The leadership connections within the courses was not apparent. Dr. Carroll plans to potentially implement leadership with the freshmen. Dr. Luna suggested focusing on scheduling and cost estimates in the Project Management course to cover the management aspect of Outcome 9 in more depth.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies	• Course content • Teaching techniques • Improvements in technology • Prerequisites	• Course sequence • New courses • Deletion of courses • Changes in frequency or scheduling of course offerings
Changes to the Assessment Plan	• Student learning outcomes • Artifacts of student learning • Evaluation process	• Evaluation tools (e.g., rubrics) • Data collection methods • Frequency of data collection

Please describe the actions you are taking as a result of these findings.

3) An ability to communicate effectively with a range of audiences.

Listed below are the detailed plans of action associated with each course for continuous improvement related to Outcome 3.

CVNG 3020—Structural Analysis Lab: Beginning in the fall 2020 semester, the instructor will provide tutorials on best practices associated with oral presentations to alleviate some of the issues observed during the final presentations.

CVNG 3140—Hydraulic Engineering Lab: There is no continuous improvement planned for the 2020-2021 academic year in this course with respect to Outcome 3. The oral presentations did not take place in the spring 2020 semester due to the COVID-19 pandemic.

CVNG 4500—Capstone Design I: There is no continuous improvement planned for the 2020-2021 academic year in this course with respect to Outcome 3.

CVNG 4510—Capstone Design II: There is no continuous improvement planned for the 2020-2021 academic year in this course with respect to Outcome 3.

Other Suggested Improvements: SLU will incorporate a new CORE Curriculum beginning in the fall of 2021 across all colleges, which will include both technical writing and technical presentations. This will indirectly impact Outcome 3. Furthermore, the civil engineering faculty will be reevaluating the current use of visualization tools taught within the curriculum (i.e. AutoCAD) and consider changes in the curriculum that would incorporate more advanced visual tools such (e.g. Autodesk REVIT and Civil 3D) so students are prepared to use those tools to help convey their message. Furthermore, to evaluate students on a more individual basis, the Transportation News presentations in the CVNG 3120 course will be used to evaluate students ability to communicate to their peers, and provide individual feedback to students. Similarly, the Intro to Civil Engineering course will incorporate presentation skills beginning in the fall of 2020. Students will give both virtual and live presentations and will receive peer feedback from other students and the instructor.

6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

Listed below are the detailed plans of action associated with each course for continuous improvement related to Outcome 6.

CVNG 3030—Civil Engineering Materials: Based on the final reports, it appears that the majority of groups misunderstood what they needed to evaluate during the preliminary mix design phase of the project. Most of the groups simply compared the unit weights of the mixes to ensure they were under weight on the project and gave no consideration to compressive strength. Given that compressive strength is a critical property of concrete mix design, it

is important that students understand the importance of related comparisons when designing and selecting a mix. The reports also indicated that students may not understand how to theoretically adjust concrete mix proportions beyond the example given in class. The assignment will be revised to more clearly convey the expected deliverables of the project to ensure that students are evaluating various parameters properly. Furthermore, the instructor will spend more time on mix design and how to manipulate those mixes to obtain the desired results.

CVNG 3041—Sustainability and Environmental Engineering Lab: There is no continuous improvement planned for the 2020-2021 academic year in this course with respect to Outcome 6.

CVNG 3100—Geotechnical Engineering Lab: Additional field data will be provided in this laboratory to make the field earthwork construction evaluation a more meaningful assignment.

CVNG 3140—Hydraulic Engineering Lab: The results of the assessment indicate that the all students successfully met the objective. Through the development of the rubric and evaluation of the reports, the instructor recognized the assignment could have a stronger focus on interpretation of the laboratory data within the discussion section. The laboratory assignment will be reformatted to explicitly state that the discussion questions should be addressed in the Discussion Section of the report. The instructor will also remind students to address the discussion questions in their report during the second week of the lab, which is dedicated to data analysis and report preparation.

9) An ability to explain basic concepts in management, business, public policy, and leadership.

Listed below are the detailed plans of action associated with each course for continuous improvement related to Outcome 9.

CVNG 3040—Sustainability and Environmental Engineering: These students (and the entire class overall) did very well on these questions specifically, the broad topic of climate change issues generally. Continuous improvement activities for CVNG 3040 include writing an abstract of causes and impacts of climate change on society, what role engineers (and scientists) do and should play in crafting policy in the United States.

CVNG 3070—Engineering Project Management: There is no continuous improvement planned for the 2020-2021 academic year in this course with respect to Outcome 9.

CVNG 3100—Geotechnical Engineering Lab: There is no continuous improvement planned for the 2020-2021 academic year in this course with respect to Outcome 9.

Other Suggested Improvements: Given that this outcome is only assessed at the junior level, the faculty noted that leadership could be incorporated during the first year of the curriculum. Thus, leadership aspects will be incorporated into the Intro to Civil Engineering course beginning in the fall of 2020.

If no changes are being made, please explain why.

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

The assessment plan was completely revised during the 2019-2020 academic year. One particular change made during the fall 2020 semester with regard to the Other Suggested Improvement for Outcome 3:

"Furthermore, the civil engineering faculty will be reevaluating the current use of visualization tools taught within the curriculum (i.e. AutoCAD) and consider changes in the curriculum that would incorporate more advanced visual tools such (e.g. Autodesk REVIT and Civil 3D) so students are prepared to use those tools to help convey their message. Furthermore, to evaluate students on a more individual basis, the Transportation News presentations in the CVNG 3120 course will be used to evaluate students' ability to communicate to their peers, and provide individual feedback to students. Similarly, the Intro to Civil Engineering course will incorporate presentation skills beginning in the fall of 2020. Students will give both virtual and live presentations and will receive peer feedback from other students and the instructor."

Changes made thus far include,

1. Access to CADLearning.com was provided for students in CVNG 4500, which includes professional video tutorials for Autodesk REVIT and Civil 3D.
2. Presentation skills were incorporated into CVNG 1010, the Intro to Civil Engineering course. Students gave a virtual presentation and received feedback from their peers and the instructor. The students then gave a modified live presentation based on feedback received.
3. CVNG 3120 is a spring course. The Transportation News presentation will be incorporated in the spring of 2021.

B. How has this change/have these changes been assessed?

The changes will be assessed during and after the 2020-2021 academic year.

C. What were the findings of the assessment?

There are no results to-date related to the 2020-2021 academic year assessment.

D. How do you plan to (continue to) use this information moving forward?

Future assessment data will provide continued information regarding these changes and will allow for further enhancements.

IMPORTANT: Please submit any assessment tools and/or revised/updated assessment plans along with this report.

Outcome 3: An ability to communicate effectively with a range of audiences.

Course: CVNG 3020 – Structural Analysis Lab
Performance Measure: Final Project Oral Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic. **OR** The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.	The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.	The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic. AND The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.

Course: CVNG 3020 – Structural Analysis Lab
Performance Measure: Final Project Report (Written Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The report is not well organized (e.g. sections out of order) and the necessary detail to describe the work completed is lacking. **OR** The authors demonstrate minimal attention to context and purpose. The language sometimes impedes the meaning because of errors in usage.	The report is organized and mostly includes the necessary detail to describe the work completed. The background theory is adequate, but relevant source information may be lacking. The authors demonstrate awareness of context and purpose. The language is clear and the writing contains few grammatical errors.	The report is very well organized and includes the necessary detail to describe the work completed. The background theory is adequate, complete with relevant source information. **AND** The authors demonstrate a thorough understanding of context and purpose. The language is clear and the writing is virtually error-free.

Course: CVNG 3140 – Hydraulic Engineering Lab
Performance Measure: Water Resources and Entrepreneurship Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic. **OR** The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.	The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.	The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic. AND The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.

Course: CVNG 4500 – Capstone Design I
Performance Measure: Capstone Final Design Alternatives Project Presentation (Oral Communication)

1 – Does not meet expectations	**2 – Meets expectations**	**3 – Exceeds expectations**
The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic. **OR** The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.	The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.	The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic. **AND** The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.

Course: CVNG 4500 – Capstone Design I
Performance Measure: Capstone Preliminary Design Alternatives Project Report (Written Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The report is not well organized (e.g. sections out of order) and the necessary detail to describe the work completed is lacking. **OR** The authors demonstrate minimal attention to context and purpose. The language sometimes impedes the meaning because of errors in usage.	The report is organized and mostly includes the necessary detail to describe the work completed. The background theory is adequate, but relevant source information may be lacking. The authors demonstrate awareness of context and purpose. The language is clear and the writing contains few grammatical errors.	The report is very well organized and includes the necessary detail to describe the work completed. The background theory is adequate, complete with relevant source information. **AND** The authors demonstrate a thorough understanding of context and purpose. The language is clear and the writing is virtually error-free.

Course: CVNG 4510 – Capstone Design II
Performance Measure: Capstone Final Design Project Presentation (Oral Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The presentation is not well organized (e.g. material out of order) and the supporting materials insufficiently supports the topic. **OR** The language choices are unclear and minimally support the topic. The delivery technique detracts from the understandability of the presentation and the speaker(s) appears uncomfortable.	The presentation is organized and the supporting materials make appropriate reference to information that supports the topic. The language is appropriate for the audience and supports the topic. The delivery techniques make the presentation interesting and the speaker(s) appears comfortable.	The presentation is very well organized and the supporting materials make reference to information that significantly supports the topic. **AND** The language is compelling and enhances the effectiveness of the presentation. The delivery techniques make the presentation interesting and the speaker(s) appears polished and confident.

Course: CVNG 4510 – Capstone Design II
Performance Measure: Capstone Final Design Project Report (Written Communication)

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The report is not well organized (e.g. sections out of order) and the necessary detail to describe the work completed is lacking. **OR** The authors demonstrate minimal attention to context and purpose. The language sometimes impedes the meaning because of errors in usage.	The report is organized and mostly includes the necessary detail to describe the work completed. The background theory is adequate, but relevant source information may be lacking. The authors demonstrate awareness of context and purpose. The language is clear and the writing contains few grammatical errors.	The report is very well organized and includes the necessary detail to describe the work completed. The background theory is adequate, complete with relevant source information. **AND** The authors demonstrate a thorough understanding of context and purpose. The language is clear and the writing is virtually error-free.

Outcome 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions in more than one civil engineering context (e.g. construction, environmental, geotechnical, structural, transportation, water resources).

Course: CVNG 3030 – Civil Engineering Materials
Performance Measure: Fiber-reinforced Concrete Project

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The report lacks the minimum number of concrete mixtures needed for a comparison or only provides the results of the initial trial mixtures without discussion of concrete compressive strength and unit weight limitations. **OR** Fails to discuss the performance of the selected mix design with regard to durability and toughness.	The report illustrates an attempt to evaluate at least two different concrete mixtures to satisfy the needs of the fiber-reinforced concrete project. The report includes the comparison and discussion of concrete compressive strength and unit weight differences at a minimum. **AND** The report also discusses the performance of the selected mixture design with regard to durability and toughness.	The report includes a thorough evaluation of more than two concrete mixtures to satisfy the needs of the Fiber-reinforced concrete project. The results include a comparison of concrete compressive strengths and weight differences along with discussion of workability observations during trials. **AND** The report includes a thorough discussion of the performance of the selected mix design with regard to durability and toughness, including the calculation of toughness.

Course: CVNG 3041 – Sustainability and Environmental Engineering
Performance Measure: Total Carbonate and Non-carbonate Hardness of Tap Water Laboratory

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
Hardness fractions were not measured mostly properly using two techniques, OR Method was not properly delineated. OR Report was not well written.	Hardness fractions were measured mostly properly using two techniques. Method was mostly properly delineated. Report had appropriate formatting, was reasonably well written and concise, and conclusions were well thought out.	Hardness fractions were measured properly using two techniques. Method was properly delineated. Report had proper formatting, was well written and concise, and conclusions were accurate.

Course: CVNG 3100 – Geotechnical Engineering Lab
Performance Measure: Compaction Test of Soils Laboratory

1 – Does not meet expectations	**2 – Meets expectations**	**3 – Exceeds expectations**
The student group conducted a compaction laboratory experiment, but did not relate the results to engineering specifications. They interpreted and analyzed the data, but limited the work to presentation of results only. They did not make engineering recommendations for construction.	The student group conducted a compaction laboratory experiment to meet engineering specifications for a soil specimen. They interpreted and analyzed the data, but limited the work to presentation of results only. They did not make engineering recommendations for construction.	The student group conducted a compaction laboratory experiment to meet engineering specifications for a soil specimen. They interpreted and analyzed the data, and extended the results to make engineering recommendations for construction.

Course: CVNG 3140 – Hydraulic Engineering Lab
Performance Measure: Pump characteristics curves laboratory

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The student group conducted a pump characteristic curves laboratory experiment; but through the data analysis and reporting process, they did not generate accurate pump characteristic curves. **OR** The student group did not provide correct interpretation of the lab results and theory for more than one of the directed discussion questions.	The student group conducted a pump characteristic curves laboratory experiment and through the data analysis and reporting process, they generated accurate pump characteristic curves with only minor flaws. **AND** The student group did not provide correct interpretation of the lab results and theory for one of the directed discussion questions.	The student group conducted a pump characteristic curves laboratory experiment and through the data analysis and reporting process, they generated accurate pump characteristic curves. **AND** The student group provided correct interpretation of the lab results and theory for all directed discussion questions.

Outcome 9: An ability to explain basic concepts in management, business, public policy, and leadership.

Course: CVNG 3040 – Sustainability and Environmental Engineering
Performance Measure: Homework Problem on Climate Change

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
Did not sufficiently list or describe three means that society may use to sequestration carbon dioxide to inhibit climate change. **AND** Did not sufficiently describe the major negative impact or impacts for each carbon sequestration method.	Listed and somewhat described three means that society may use to sequestration carbon dioxide to inhibit climate change. Properly described the major negative impact or impacts for each carbon sequestration method.	Properly described three means that society may use to sequestration carbon dioxide to inhibit climate change. Properly described the major negative impact or impacts for each carbon sequestration method.

Course: CVNG 3070 – Engineering Project Management
Performance Measure: Graded assignment on project management (scope and resources)

1 – Does not meet expectations	**2 – Meets expectations**	**3 – Exceeds expectations**
The assignment on scope of work and resources focused on management of a project. A basic understanding of the reading was not apparent by the answers to the questions presented. Few of them were not framed correctly and were confusing. **OR** The interpretation of the essay reading was incorrect, and several statements were incoherent.	The assignment on scope of work and resources focused on management of a project. An understanding of the reading was apparent by the answers to the questions presented. Most of them were correct within a coherent framework. **OR** The interpretation of the essay reading was correct, and several statements were coherent.	The assignment on scope of work and resources focused on management of a project. An understanding of the reading was apparent by the answers to the questions presented. All of them were correct within a comprehensive and coherent answers. In some cases it exceeded the requirements of the assignment. **OR** The interpretation of the essay reading was correct, and all the statements were coherent.

Course: CVNG 3070 – Engineering Project Management
Performance Measure: Exam question on project management

1 – Does not meet expectations	**2 – Meets expectations**	**3 – Exceeds expectations**
When asked the play the role of a project manager on construction project, the student was able to explain “Safety”. However, it struggles differentiating form different roles (Owner, Engineer, or Contractor).	When asked the play the role of a project manager on construction project, the student was able to explain “Safety” from only one point of view of the Owner, Engineer, and Contractor.	When asked play the role of a project manager on construction project, the student was able to clearly explain “Safety” from the point of view of the Owner, Engineer, and Contractor. Examples and case studies were described or referenced.

Course: CVNG 3100 – Geotechnical Engineering Lab
Performance Measure: Exam question on project management

1 – Does not meet expectations	2 – Meets expectations	3 – Exceeds expectations
The student group conducted a compaction laboratory experiment, but did not relate the results to engineering specifications. They interpreted and analyzed the data, but limited the work to presentation of results only. They did not make engineering recommendations for construction.	The student group conducted a compaction laboratory experiment to meet engineering specifications for a soil specimen. They interpreted and analyzed the data, but limited the work to presentation of results only. They did not make engineering recommendations for construction.	The student group conducted a compaction laboratory experiment to meet engineering specifications for a soil specimen. They interpreted and analyzed the data, and extended the results to make engineering recommendations for construction.