Construction Management Program

Assessment Report:

Analysis of the 2019-2022 Assessment Cycle for the Construction Management Program at EMU

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Table of Contents

Assessment Report:

Analysis of the 2019-2022 Assessment Cycle for the Construction Management Program at EMU

The Construction Management (CM) Program at EMU established an assessment process for continuous improvement of the program and to meet the requirements of the Higher Learning Commission, ACCE, and EMU internal assessment and quality assurance. The Program faculty will review the report in the fall semester of 2022 for feedback, final approval of recommendations, and their implementations in the next assessment cycle starting winter of 2022.

Implementation of Previous Assessments Recommendations

Since the last ACCE accreditation, the CM Program at EMU has implemented the following recommendations based on assessments, ACCE updated standards, and feedback from constituencies:

1) **Adding CNST 312 Structure course.** Previously the program only had one course in structural design, which was CNST 412. However, it was challenging to cover the structural analysis and design in one course, hence, the introduction of CNST 312.

2) **Adding CNST 230 Computer Application in Construction Management**. With the advancement of technology in construction, the program added a new course to prepare students with the skills and knowledge to meet this requirement.

3) **Requiring Business Minor:** The program requires students to complete the General Business Minor. This change was approved in the 2017-18 academic year and became a part of the curriculum in the fall 2018 semester. The rationale of this minor is to boost the construction business preparedness of our students and to provide them a platform to advance to an MBA degree as they choose easily.

Assessment for Academic Years 2019-2022

The following are observations about assessment data collected in the past three years:

1) Graduating Students Exit Survey: The program administers a survey each semester for graduating students during the final week. The survey is anonymous, and completing it is optional. This approach led to low participation of the students, especially during the first two academic years of the current cycle.

   Continuous Improvement Measure: The program considers the Exit Survey a critical indicator of an indirect assessment of the program's Student Learning Outcomes (SLOs). Therefore, taking the survey remained optional; however, it must be conducted during class.

   Results: There was a substantial increase in taking the survey.

   Recommendations for the next cycle: The program should consider requiring completion of the survey from all graduating students, and conducting it much earlier in the semester, while students are encouraged to complete it.

2) Course Assessment: Currently, the program requires assessing each SLO every semester by either two direct assessments or one direct and one indirect assessment.

   2.1 Direct Assessment: faculty members can select to use one of the following measures to evaluate each SLOs.

   1) An assessment of assignments, exams, quizzes, and individual reports and/or projects that are part of a course grade

2) The final grade score was used for courses that mainly focused on a specific outcome. The following list was used in the first two years of assessment:

SLO	Course Number and Title
1	CNST 406W Construction Law
3	CNST 213 Construction Safety
4	CNST 304 Construction Estimating and Bidding
5	CNST 361 Planning and Scheduling
6	CNST 406W Construction Law
7	CNST 229 Analysis of Commercial Prints
9	CNST 450 Fundamentals of Construction Project Management
10	CNST 230 Construction Management Computer Applications
11	CNST 206 Surveying
12	CNST 302 Contract Documents, Regulations, and Specifications
13	CNST 403 Production Control
15	CNST 436 Heavy/Highway Construction Means and Methods
17	CNST 406W Construction Law
18	CNST 440 LEED for New Construction and Major Renovations
19	CNST 412 Structural Systems
20	CNST 303 Electrical, Mechanical, and Equipment Systems

A sample of direct assessment of SLO using assessment measure that is part of the course grade is presented in Appendix A.

2.2 Indirect Assessment: The Program has used an Exit Survey as an indirect assessment measure of SLOs. Participation in the first four semesters was low, including no participation in the fall of 2019. The actions taken in the past two semesters have improved participation significantly. A sample of an indirect assessment of a course using an exit survey is presented in Appendix B.

A second approach to address this issue was to run a survey in each course that measures a particular SLO. Dr. Ilozor volunteered to implement this approach in four of his classes during the winter semester. Sample of direct assessment of SLO using the final grade of a course presented in Appendix C.

The simple survey asks students to evaluate the SLOs on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree) and ask for feedback on the course. A sample of the survey filled in CNST 440 is shown in Appendix D. The proposed assessment for this survey is to have at least 50% of students select six (6) or more on a scale of 1-10. The following is the summary of the findings for the two SLOs mapped to this course.

Results of Indirect Assessment of SLOs in CNST 440- Winter 2022

SLO	Assessment	
	6+	%
6) Analyze professional decisions based on ethical principles.	16	94%
18) Understand the basic principles of sustainable construction.	**16**	**94%**

The results of the indirect assessment of CNST 228, 302, and 303 are shown in Appendix E.

Continuous Improvement Measure: The program observed that having the final grade of a course to assess SLOs directly may not be the best practice. Therefore, the program decided to minimize assessing courses based on the final grade alone, as shown in Tables 1-3 and the file titled "Assessment Summary 2019-2022."

Results: Using the final grade of the course as a direct assessment measure has been dropped to three courses only. All assessment measures (e.g., exams and homework) used in these three classes are available for review.

Recommendations for the next cycle: Consider moving to use an assessment measure that is part of the course grade as a direct measure.

Table 1: Assessment of the CNST Program for 2021-2022 Academic Year

Student Learning Outcomes	Academic Year 2021-2022 (1)				Direct Assessment (1)
	Fall 2021		Winter 2022		
	Assessment 1	Assessment 2 (*)	Assessment 1	Assessment 2 (*)	
1) Create written communications	87%	75%	88%	58%	CNST 406W
2) Create oral presentations	100%	86%	86%	63%	CNST 450
3) Create a construction project safety plan.	94%	100%	90%	100%	CNST 213
4) Create construction project cost estimates.	100%	78%	100%	90%	CNST 304
5) Create construction project schedules.	95%	100%	100%	100%	CNST 361
6) Analyze professional decisions based on ethical principles.	96%	100%	88%	74%	CNST 406W
7) Analyze construction documents	84%	95%	84%	95%	CNST 229
8) Analyze methods, materials, and equipment	100%	100%	100%	100%	CNST 201
9) Apply const. managt skills in a multi-disciplinary team.	100%	71%	100%	68%	CNST 450
10) Apply electronic-based technology	95%	100%	100%	100%	CNST 230
11) Apply surveying techniques	76%	100%	** 76%	** 100%	CNST 206
12) Understand different methods of project delivery	90%	100%	87%	84%	CNST 302
13) Understand construction risk management.	85%	100%	91%	84%	CNST 450
14) Understand construction accounting and cost control.	69%	85%	91%	79%	CNST 450
15) Understand construction quality assurance and control.	100%	86%	77%	84%	CNST 450
16) Understand construction project control processes.	92%	100%	77%	84%	CNST 450
17) Understand the legal implications	100%	86%	94%	90%	CNST 406W
18) Understand the basic principles of sustainable construction.	94%	86%	89%	79%	CNTST 440
19) Understand the basic principles of structural behavior.	100%	94%	83%	83%	CNST 312
20) Understand principles of mech., elect. and piping systems.	100%	58%	100%	63%	CNST 303

Direct: selected assessment such as an assignment or examination that is part of a course grade

Direct: final grade of a course

Indirect- Exit Survey of graduating students

(1) Details of the assessment including samples and results are shown in Standard 3 of the report

(*) Requirement calls for at least 50% of the students surveyed either Strongly Agree or Somewhat Agree that the program

**** Summer 2021**

Table 2: Assessment of the CNST Program for 2020-2021 Academic Year

Student Learning Outcomes	Academic Year 2020-2021				Direct Assessment
	Fall 2020 Results		Winter 2021 Results		
	Assessment 1	Assessment 2 (*)	Assessment 1	Assessment 2 (*)	
1) Create written communications	75%	67%	71%	66%	CNST 406W, Essay Assignment
2) Create oral presentations	96%	66%	95%	67%	CNST 213, Presentation
3) Create a construction project safety plan.	100%	67%	100%	66%	CNST 213
4) Create construction project cost estimates.	100%	66%	100%	33%	CNST 304, Assignment
5) Create construction project schedules.	80%	66%	100%	33%	CNST 361, Assignment
6) Analyze professional decisions based on ethical principles.	88%	67%	76%	66%	CNST 406W, Essay Assignment
7) Analyze construction documents	100%	67%	100%	0%	CNST 229
8) Analyze methods, materials, and equipment	100%	66%	100%	33%	CNST 212, Exams
9) Apply const. managt skills in a multi-disciplinary team.	83%	67%	86%	66%	CNST 450, Quizzes
10) Apply electronic-based technology	100%	67%	100%	33%	ProCore Certificate
11) Apply surveying techniques	100%	100%	88%**	33%	CNST 206
12) Understand different methods of project delivery	56%	100%	100%	66%	CNST 302
13) Understand construction risk management.	83%	67%	93%	66%	CNST 450, Homework
14) Understand construction accounting and cost control.	50%	66%	86%	33%	CNST 450, Exams
15) Understand construction quality assurance and control.	83%	100%	93%	33%	CNST 450, Homework
16) Understand construction project control processes.	88%	66%	93%	66%	CNST 450, Quizzes
17) Understand the legal implications	100%	100%	81%	67%	CNST 406W, Exams
18) Understand the basic principles of sustainable construction.	93%	67%	85%	67%	CNTST 440
19) Understand the basic principles of structural behavior.	100%	67%	82%	66%	CNST 412, Exams
20) Understand principles of mech., elect. and piping systems.	93%	67%	100%	33%	CNST 303

Direct: selected assessment such as an assignment or examination that is part of a course grade
Direct: final grade of a course
Indirect- Exit Survey of graduating students

(*) 1) Requirement calls for at least 50% of the students surveyed either Strongly Agree or Somewhat Agree that the program prepared them to meet the SLO outcome.

2) Only three students responded to the survey.

Table 3: Assessment of the CNST Program for 2019-2020 Academic Year

Student Learning Outcomes	Academic Year 2019-2020				Comments on Direct Assessment
	Fall 2019 Results		Winter 2020 Results		
	Assessment 1	Assessment 2 (*)	Assessment 1	Assessment 2 (*)	
1) Create written communications	100%		94%	100%	CNST 406W
2) Create oral presentations	100%		94%	100%	CNST 213, Presentation
3) Create a construction project safety plan.	94%		95%	100%	CNST 213
4) Create construction project cost estimates.	95%		100%	80%	CNST 304, Assignment
5) Create construction project schedules.	91%		100%	80%	CNST 361, Assignment
6) Analyze professional decisions based on ethical principles.	100%		94%	100%	CNST 406W
7) Analyze construction documents	100%		100%	60%	CNST 229, Assignment
8) Analyze methods, materials, and equipment	75%	83%	100%	80%	CNST 212, Quizzes and Exam
9) Apply const. managt skills in a multi-disciplinary team.	100%		90%	80%	CNST 450, Quiz
10) Apply electronic-based technology	96%		100%	80%	CNST 230, ProCorre Certificate
11) Apply surveying techniques	100%		100%**	100%	CNST 206
12) Understand different methods of project delivery	100%		96%	100%	CNST 302
13) Understand construction risk management.	100%		85%	60%	CNST 403 Fall and CNST 450, Exam in the Winter
14) Understand construction accounting and cost control.	100%	100%	85%	60%	Fall: CNST 403, Assignment, Winter: CNST 450, Quiz
15) Understand construction quality assurance and control.	100%		90%	80%	CNST 436 in the Fall, CNST 450, Quiz in the Winter
16) Understand construction project control processes.	100%	100%	80%	60%	Fall: CNST 403, Assignment, Winter: CNST 450, Quiz
17) Understand the legal implications	100%		94%	60%	CNST 406W
18) Understand the basic principles of sustainable construction.	81%		72%	80%	CNST 440
19) Understand the basic principles of structural behavior.	100%	77%	94%	80%	CNST 412, Quizzes and Exam
20) Understand principles of mech., elect. and piping systems.	100%		100%	60%	CNST 303

Direct: selected assessment such as an assignment or examination that is part of a course grade
Direct: final grade of a course
Indirect- Exit Survey of graduating students

(*) (1) Requirement calls for at least 50% of the students surveyed either Strongly Agree or Somewhat Agree that the program prepared them to meet the SLO outcome.

(2) In Fall 2019, few number of students graduated and non filled the exit survey

**** Summer 2019**

3) The American Institute of Contractors (AIC) Certification: The AIC's Associate Constructor (AC) Certification (Level 1) is the first level of certification in the Constructor Certification Program. There has been a debate about this exam and whether to use the results in the assessment or not. The CM faculty decided not to use the exam in the evaluation. However, students must take the exam, but passing it is not a requirement for graduation. The following is the assessment report submitted by the lead faculty for this exam, Dr. Jarrah:

"

Assessment Report of the AC Exam for the Winter 2022 Semester

Dr. Raed Jarrah

The AIC has released the final AC Exam results, and the data shows that students put in a substantial effort to do well in the exam. The results show EMU is almost in line with the national average performance i n this exam - 9 out of 22 students passed this time. I also sent an email to the students to give their feedback about the exam and will share their responses further on in this report.

I would like to again bring up the issue of the AC exam:

- I reiterate the position that the exam is a substantial burden on students with practically little (if any) perceived recognizable benefit to employers.
- CNST 450 can still balance having both a capstone and the AC exam, and responsible students seem to be able to prepare for both.
- The benefit of using the AC exam as a tool for SLOs (6, 7, 8, and 12 – 20) in our ACCE accreditation report is going unutilized. However, it understandably would not meet our 70/70 attainment benchmark for most of the SLOs.
- The carrot & stick approach (course grade is impacted up to ±20% based on AC exam results, with 190/300 being the neutral point) has produced a stark improvement in student performance compared to last year. Many students were understandably upset that this exam could lead to a -20% penalty on their course grade if they performed poorly.
- However, the incentive/disincentive scheme could not be put to use this semester. The preliminary results of the AC exam were released on May 25, three weeks after our deadline to post grades, despite several follow-up reminders to AIC.

Regarding the incentive/disincentive scheme:

- Had we been able to apply the above scheme, the student grades would have been impacted as follows:
    - Nine (9) students would have gained between + 10% and +20% on their course grade by scoring above the passing grade (215/300)
    - Seven (7) students would have gained up to +10% on their course grade by scoring below passing but above the "adjusted" national average (190/300. The actual national average is around 200, but I lowered it to be more lenient)
    - Five (5) students would have lost up to -10% on their course grade (scoring below 190/300)
    - One (1) student would have lost between - 10% and -20% on his/her course grade (scoring below 165/300)
- The impact on the final CNST 450 course grades would have been:
    - Seven (7) students with an A would have gained points (but can't score higher than an A)
    - Three (3) students in the B-range would have been raised to an A
    - No students with an A or A- would have lost any grades

    - Two (2) students in the B-range would have kept their grades in that range
    - Four (4) students in the B-range would have been dropped to the C-range
    - One (1) student with a C+ would have received an F
- The results show that the incentive/disincentive scheme would have increased the grade distribution's bimodality, with most grades in A's and C's with only a couple of B's.
- Generally, it would have hurt below-average students and would have practically been a threat of punishment rather than a reward for most. Basically, it is a lot more stick than carrot.
- Students with an A already would not have been able to make use of the bonus, while students with a B would have been more likely to lose points than gain them. Borderline students (C) would have most likely failed the course because of this scheme (which is not necessarily a bad thing if we want to uphold a standard of performance).

The email I sent out to the students asked for their feedback on the AC exam. So far, 6 students have responded (all got A's on the course). Their responses are listed below the questions:

1) What material did they found useful (and not useful) in studying for the AC exam?
    - Three (3) students found the AC guidebooks helpful
    - Two (2) students found the 2018 guide was enough, while the 2012 version was too big
    - Two (2) students found the lecture slides helpful
    - Two (2) students said Work experience helped a lot.
    - All said, the practice quizzes I provided helped
    - Three (3) said that the industry does not care about the exam, and it wouldn't matter on a CV.

2) Question on if students felt the Bonus/Penalty was fair, and if they were motivated by it
    - Two (2) students found it fair and motivating
    - Three (3) students found it unfair and unwelcome stress during a busy semester with a capstone project to boot. Particularly worrying was the possibility of dropping from a high B to a D, and failing the course.
    - One (1) student said that covering the registration fee is not a motivating factor. The department covering the exam cost is an insulting pittance compared to other fees students pay. They would rather pay for the exam themselves if it meant there were no strings attached.
3) If the self-study topics were sufficiently covered outside of the lectures.
   All students said that the provided material was sufficient for self-study topics.

Subsequently, I would like to propose the following:

- **Remove the AC exam** as a requirement from CNST 450. It is not popular and is perceived to have no value for job seekers. I doubt that any of our passing students ever bother to maintain the certification or even go on to do the CPC exam. Those who see value in this certification will do it on their own anyway, so let's stop throwing money at AIC. <u>I appreciate the opportunity to have discussed this with our Industry Advisory Board in our last meeting, but we have not reached a firm conclusion on what to do instead</u>.
  My recommendation is to replace the AC exam with a more comprehensive capstone project, adding a Safety Plan and Method Statement to the deliverables.

- If the AC Exam is to continue to be a requirement for CNST 450, I propose we offer the computerized version instead of the pencil-and-paper version. The computer version has flexible exam dates, and the preliminary results are returned much faster.

    - Continue to cover the exam registration costs for students. While the cost of the exam is not an incentive to study for it (as evidenced by poor student performance in the fall), it is

still one less thing to complain about. I have learned that I should not state that the Bonus/Penalty is in return for covering the registration fees.

- Rebrand the Bonus/Penalty by making the AC exam 15% of the course grade with a bonus scheme. The effect will be almost the same as before, only now students would not see it as taking something away from what they already earned. The decrease in range will also be less stressful as a B+ student would not be at risk of getting a D+ and failing, while borderline C-range students would still be weeded out, and B-range students would get the chance to get enough of a boost into the A-Range."

Continuous Improvement Measure: In the past, students used to pay for the exam. Starting in the fall semester, the program will pay for the exam to reduce the burden on students.

Results: To be determined by next summer.

Recommendations for the next cycle: remove the exam if results do not change by the end of the fall 2022 or winter 2023 semester.

4) Data Collection and Analysis: The Program Coordinator is responsible for collecting the assessment data for the program. There were some issues with this approach since the Program Coordinator has changed three times due to retirements and changes in the structure of the program (i.e., the former Director of the school returned to faculty). In addition, in the fall of 2019, none of the graduating students filled out the exit survey.

   Continuous Improvement Measure: The current Program Coordinator or any other faculty shall volunteer to lead accreditation tasks for at least an entire assessment cycle of three years. A semi-cycle one-year analysis report shall be prepared and discussed by faculty for potential implementation in the following year.

   Results: To be determined after three years.

   Recommendations for next cycle: The Program needs to continue collecting assessment data, conduct an annual assessment report and provide recommendations for implementation the following year, if any. This report can be used to meet the yearly assessment requirement of HLC.

Conclusions

The continuous assessment of the CNST Program indicates that all outcomes have been met. However, there are few exceptions of the SLOs when using graduating exit surveys as a measure of indirect assessment. These cases are common when there is low participation of students taking the survey. Therefore, the results in these cases are not significant and were not considered a major issue. In addition, in the last year, when we had good participation in the survey, no major issues were observed. It is worth mentioning that the correct measures helped in resolving this issue.

Appendix A

Sample of Direct Assessment of SLOs- Using Assessment Measure Part of the Course Grade

SLO 10: Apply electronic-based technology

Course: CNST 230 CM Computer Applications

Semester: Fall 2021

Direct Assessment: Assignment – 3D Garage Model

Instructor: Adam Bogedain

The Assessment document contains the following exhibits:

Exhibit 1: Assessment and Rubric

Exhibit 2: Sample of student work

Exhibit 3: Data and Analysis

Exhibit 4: Assessment Results and Recommendations

Exhibit 1: Assessment

SketchUp Garage Model Assignment

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For this assignment, you will build your garage model in Sketchup, just like a traditional structure, piece by piece.

I want to make it open for you to build a basic or your dream garage or barn.

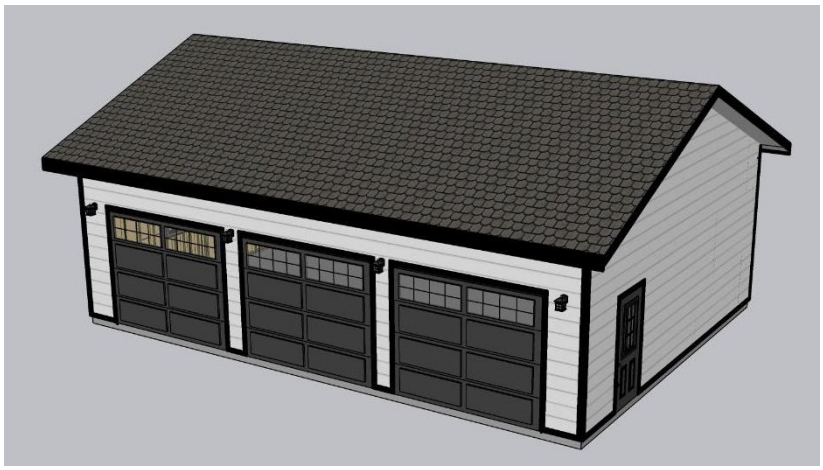
For the Garage at a minimum I want you to build:

- 24' x 24' Footprint
- Lay down a 4" or 6" slab (for this project don't worry about footings)
- 2 x 4 or 2 x 6 framing
- Wall and roof sheathing
- 3 openings – feel free to add more
  - 1 garage door opening
  - 1 service door
  - 1 window
  - For doors and windows, you can get them from 3D Warehouse as I will explain
- Roof pitch is open to your discretion as it is your garage
- If you want to go all out and make the ultimate garage, feel free! I like pushing the envelope.

Garage Model Rubric

Criteria	Ratings		Pts
Min 24' x 24 Footprint	**1 pts** **Full Marks**	**0 pts** **No Marks**	1 pts
Concrete slab - 4" or 6"	**2 pts** **Full Marks**	**0 pts** **No Marks**	2 pts
Framing 2x4 or 2x6	**7.5 pts** **Full Marks**	**0 pts** **No Marks**	7.5 pts
Sheathing, Siding & Roofing - walls and roof	**7.5 pts** **Full Marks**	**0 pts** **No Marks**	7.5 pts
Corner Framing Frame corners with one of the typical 2, 3 or 4 stud corners	**4 pts** **Full Marks**	**0 pts** **No Marks**	4 pts
Garage Door Frame Frame a garage door with typical form	**4 pts** **Full Marks**	**0 pts** **No Marks**	4 pts
Entry & Window Openings Entry & Window Opening Framing	**4 pts** **Full Marks**	**0 pts** **No Marks**	4 pts
			Total Points: 30

Exhibit 2: Sample of student work – 3D Garage Model



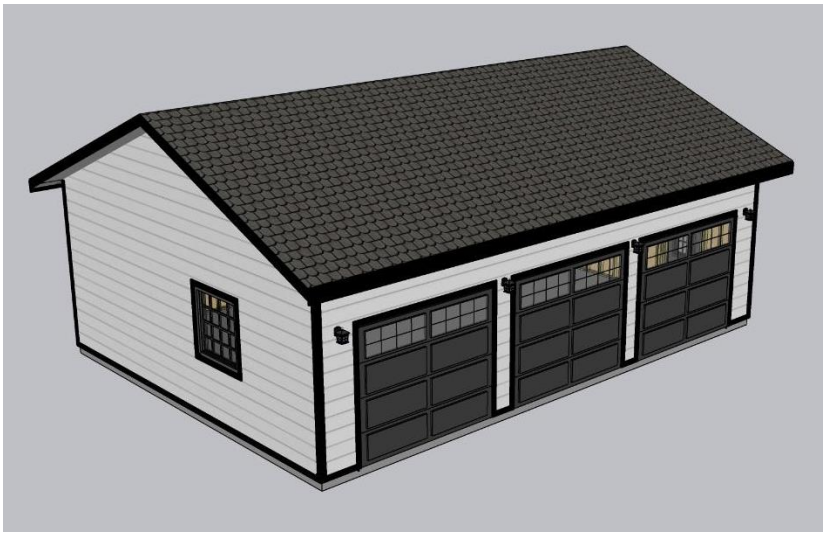


Exhibit 3: Data and Analysis

Student	Points	%
	30	**100**
1	26	87%
2	26	87%
3	10	33%
4	31	103%
5	29	97%
6	28	93%
7	26	87%
8	30	100%
9	32	107%
10	31	103%
11	29	97%
12	27	90%
13	30	100%
14	29	97%
15	31	103%
16	31	103%
17	25	83%
18	30	100%
19	30	100%
20	30	100%

Number of students =	**20**
Students with Grade ≥ 70 =	**19**
% of Students with Grade ≥ 70 =	**95%**
Average =	**93.5**
Min =	**33.3**
Max =	**106.7**

Exhibit 4: Assessment Results and Recommendations

Assessment Results:

95% of participating students scored 70% or better. Please note that students who put extra effort into their assignments are awarded up to two points extra.

Summary and Recommendations:

Students met the requirement of the course assessment. Consider alternative software for rendering that may help

Actions Needs for Continuous Improvement:

In the future, I plan to have students render their models with software that graduates may use in Construction Management and related fields in Michigan.

Appendix B

Sample of Indirect Assessment of SLOs- Using Exit Survey

SLO 1: Create written communications appropriate to the construction discipline.

Semester: Fall 2021

Indirect Assessment: Student Exit Survey

Instructor: Raed Jarrah

The Assessment document contains the following exhibits:

Exhibit 1: Assessment
Exhibit 2: Exit Survey Results for SLO 1
Exhibit 3: Assessment Results and Recommendations

Exhibit 1: Assessment

The survey below was distributed using an online survey to the Construction Management program's undergraduate students at the end of the semester.

The Construction Management (CM) Program and ACCE Outcomes:
Please rate to what degree the EMU CNST program has adequately prepared you for the following CM and ACCE program outcomes using the following criteria:

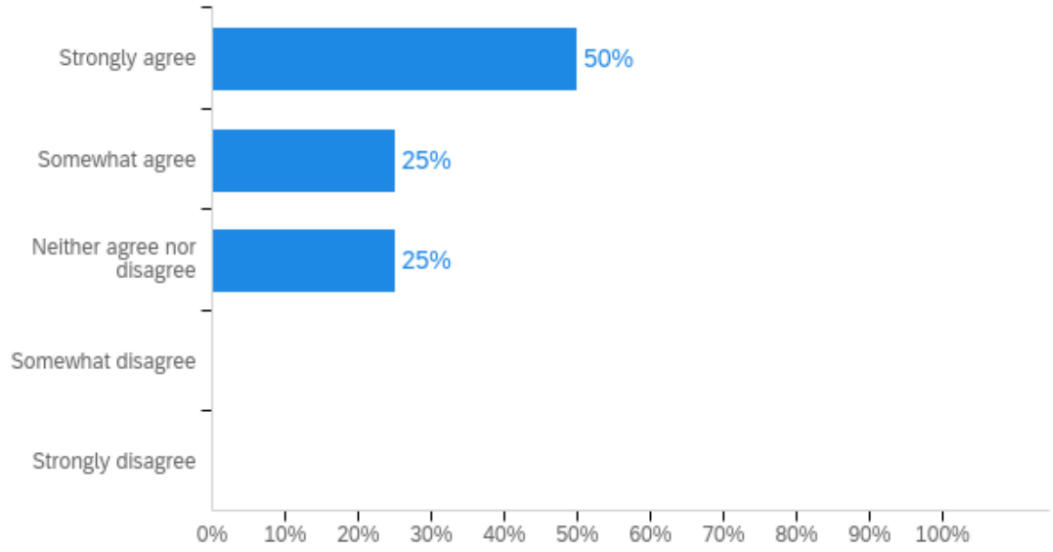
1) Strongly agree
2) Somewhat agree
3) Neither agree nor disagree
4) Somewhat disagree
5) Strongly disagree

Survey Questions:

1) Create written communications appropriate to the construction discipline.
2) Create oral presentations appropriate to the construction discipline.
3) Create a construction project safety plan.
4) Create construction project cost estimates.
5) Create construction project schedules.
6) Analyze professional decisions based on ethical principles.
7) Analyze construction documents for planning and management of construction processes.
8) Analyze methods, materials, and equipment used to construct projects.
9) Apply construction management skills in a multi-disciplinary team
10) Apply electronic-based technology Apply electronic-based technology to manage the construction process
11) Apply surveying techniques for construction layout and control
12) Understand different methods of project delivery and the roles and responsibilities of all consistencies involved in the design and construction process.
13) Understand construction risk management
14) Understand construction accounting and cost control
15) Understand construction quality assurance and control
16) Understand construction project control processes
17) Understand the legal implications of contract, common, and regulatory law to manage a construction project
18) Understand the basic principles of sustainable construction
19) Understand the basic principles of structural behavior
20) Understand the basic principles of mechanical, electrical and plumbing systems.

Exhibit 2: Exit Survey Results

1) Create written communications



#	Answer	%	Count
1	Strongly agree	50%	4
2	Somewhat agree	25%	2
3	Neither agree nor disagree	25%	2
4	Somewhat disagree	0%	0
5	Strongly disagree	0%	0
	Total	100%	8

Exhibit 3: Assessment Results and Recommendations

Assessment Results:
75% of participating students responded in agreement ("Strongly agree" or "Somewhat agree").

Summary and Recommendations:
Students met the requirement of the course assessment.

Actions Needs for Continuous Improvement:
No action is needed at this time

Appendix C

Sample of Direct Assessment of SLO- Using Final Grade of a Course

SLO 12: Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.

Course: CNST 302 – Contract Documents, Regulations, & Specifications

Semester: Fall 2021

Direct Assessment: Quizzes and tests – two direct assessments.

Instructor: Dr. Ben Ilozor

This assessment document contains the following exhibits:

Exhibit 1: Outline of assessment and/or grading rubrics used & performance standards set
Exhibit 2: Sample of graded student work addressing SLO
Exhibit 3: Performance Standard Data and Analysis
Exhibit 4: Assessment Results and Recommendations

Exhibit 1: Assessment and/or Rubric

Students are required to complete weekly quizzes and complete three tests.
Performance standard: At least 70% of participating students will score at least 70% [C-] or better.

Graded Items:

Test 1	100
Test 2	100
Test 3	100
Quizzes/Assignments	100
Participation	100
Total	**500**

Grade Point Breakdown (ignore system grading based on percentage):

A	500-475	B-	424-400	D+	349-340
A-	474-450	C+	399-390	D	339-325
B+	449-440	C	389-375	D-	324-300
B	439-425	C-	374-350	F	below 300

A+	98 – 100%	B	84 – 87%	C-	70 – 73%
A	94 – 97%	B-	80 – 83%	D+	68 – 69%
A-	90 – 93%	C+	78 – 79%	D	64 – 67%
B+	88 – 89%	C	74 – 77%	D-	60 – 63%
				F	Below 60%

Exhibit 2: Sample of student work

Please refer to the following sample files:

1) Sample 1 of student work (Quiz) Fall 2021.

2) Sample 2 of student work (Exam) Fall 2021.

Exhibit 3: Data and Analysis

Student	Points (500)	Grade
1	445	B+
2	375	C
3	465	A-
4	455	A-
5	349	C-
6	438	B+
7	421	B
8	233	F
9	320	D-
10	383	C
11	428	B
12	455	A-
13	407	B-
14	394	C+
15	404	B-
16	401	B-
17	415	B-
18	367	C-
19	468	A-
20	434	B
21	434	B

Number of students: 21

Students with grade ≥70 (C-): 19

% of students with grade ≥70 (C-): 90%

Mean score: B-

Exhibit 4: Assessment Results and Recommendations

Assessment Results:
Over 90% of participating students scored at least 70% (C-) or better.

Summary and Recommendations:
Students met the set performance standard for the SLO addressed in this class.

Continuous Improvement Agenda, if Any:
While no particular action is needed at this time, a recent general improvement in this class is in the aspect of adjusting it for an offer to distant students, as well as regular students. Hence, it has been reconfigured for both in-class and online offers.

Student cohorts' preparedness, abilities, and aptitude vary from one semester to another in this class, as in some other program classes. Hence, as moving targets, a tremendous amount of effort is invested at the onset to determine the preparedness, abilities, and aptitude of the students in order to deliver the class in a manner that is most effective and best amenable to each cohort.

Appendix D

Sample of Indirect Assessment of SLO- Using Class Sample Survey

School of Visual and Built Environments
Construction Management Program
Indirect Assessment of Student Learning Outcome (SLO)

Course: CNST 440 – LEED for New Construction & Major Renovations

Instructor: Dr. Ben Ilozor **Semester:** Winter 2022

Note: The result of this survey is for the sole purpose of assessment and improvement of the course delivery.

For the course's intended outcome listed below, please check or circle the appropriate number that corresponds to the extent you feel the class has prepped you over the course of the semester. If you think an outcome was not attained or needs improvement, please elaborate in the space provided for suggestions.

After completing this course:

1. ***I will be able to analyze professional decisions based on ethical principles.***

Strongly Disagree **1** **2** **3** **4** **5** **6** **7** **8** **9** **10** Strongly Agree

2. ***I will be able to understand the basic principles of sustainable construction.***

Strongly Disagree **1** **2** **3** **4** **5** **6** **7** **8** **9** **10** Strongly Agree

Do you have any comments or suggestions for the course? Please outline hereunder.

I enjoyed this course, my only recommendation to understand the material better would be to have more lecture videos this would also boost participation hours. I found it hard to track my hours within the module when every PowerPoint and link was downloadable either through Word, PowerPoint, or another internet link. Also, I would recommend doing a specific discussion post that relates to the material within each module, I believe this would get more participation if the class collectively had a topic to discuss. I did enjoy the material and was able to apply ideas and code to some of my current designs at my design firm.

Note: Being sustainable is being ethical!

Appendix E

Sample of Indirect Assessment of SLO- Sample Survey Results

Results of Indirect Assessment of SLOs in CNST 228- Winter 2022

SLO	Assessment	
	6+	%
1) Create written communications	8	89%
2) Create oral presentations	8	89%
6) Analyze professional decisions based on ethical principles.	7	78%
7) Analyze construction documents	9	90%
10) Apply electronic-based technology	9	90%
11) Apply surveying techniques	8	89%
18) Understand the basic principles of sustainable construction.	8	89%
20) Understand principles of mech., elect. and piping systems.	6	67%

Results of Indirect Assessment of SLOs in CNST 302- Winter 2022

SLO	Assessment	
	6+	%
3) Create a construction project safety plan.	10	91%
4) Create construction project cost estimates.	10	91%
6) Analyze professional decisions based on ethical principles.	11	100%
7) Analyze construction documents	11	100%
9) Apply const. managt skills in a multi-disciplinary team.	**11**	**100%**
12) Understand different methods of project delivery	11	100%
13) Understand construction risk management.	11	100%
14) Understand construction accounting and cost control.	11	100%
17) Understand the legal implications	11	100%
18) Understand the basic principles of sustainable construction.	10	91%

Results of Indirect Assessment of SLOs in CNST 303- Winter 2022

SLO	Assessment	
	6+	%
1) Create written communications	8	100%
4) Create construction project cost estimates.	8	100%
6) Analyze professional decisions based on ethical principles.	8	100%
8) Analyze methods, materials, and equipment	8	100%
14) Understand construction accounting and cost control.	8	100%
18) Understand the basic principles of sustainable construction.	8	100%
20) Understand principles of mech., elect. and piping systems.	8	100%