Supplemental Assessment Report for B.S. Construction Management

Academic Year 2021-2022 Supplement to AY 2020-21

North Dakota State University

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North Dakota State University
Construction Management
Public Information Dissemination - Assessment
As Required by ACCE Standard Section VIII

I. Program Assessment Measures

An additional SLO Assessment Form/Instrument (Direct) and Pre-/Post-Assessment Survey (Indirect) were developed and used during fall 2021 and spring 2022 based on the ACCE site visit team report (Table 3.1). These instruments do not replace the existing assessment instruments, but were put in place to obtain additional information to address the ACCE site visit team's report.

SLO Assessment (Direct): The SLOs were assessed again during the 2021-2022 AY to provide updated data for the response to the ACCE site visit team report. The program decided to assess each SLO in one course (see Table 3.1). The deliverable for this assessment was the completed assessment form (cover sheet), student work examples of the assessed work, the question(s)/assessment rubric, and the assessment results/attainment summary. The goal (minimum acceptable level) for the direct assessment was 80% of those assessed achieved the specific SLO. The threshold for attainment of an SLO was 70% on the assessment instrument. Instructors had the flexibility to determine the number of assessment instruments used within a course to assess the SLO (ranged from 1 – 3). Missing/absent assessment scores (score = 0) were included in the analyses.

Pre-/Post-Survey (Indirect measure): The pre-/post-survey was developed and used for the first time in spring 2022 in response to the ACCE site visit team report. The survey was completed by students in CME 488 (Capstone course). The survey asked the student to consider his/her level of ability when they entered the CM program (pre-) and at the time of graduation (post-) for each student learning outcome. The 5 point Likert scale was: (pertaining to ability) 1: none, 2: little, 3: moderate, 4: functional, 5: proficient. A 4 or above on the Likert Scale (1-5) was considered attainment of the SLO. The goal (minimum acceptable level) for the indirect assessment was 80% of the students achieved each SLO.

Table 3.1 Assessment Measures for each SLO

SLO #	Student Learning Outcome	Course	Assessment Method	Type	Instructor	Goal: 80% of assessed attained SLO / N=sample size
1	Create written communications appropriate to the construction discipline.	CME 453	Assignment 5 – search literature and prepare document on	DA	Asa	Yes (82%) N= 50

			construction forms			
2	Create oral presentations appropriate to the construction discipline.	CME 421	Project presentations – group presentations on MEP systems (students assess individually)	DA	Yu	Yes (100%) N= 45
3	Create a construction project safety plan.	CME 405	Assignment 5 – create a safety plan and quality plan for a project	DA	Smith	No (70.2%) N= 57
4	Create construction project cost estimates.	CME 380	Assignment 6 – identification of painting and plumbing estimation concepts Exam 3 – cost estimates	DA	Banawi	Yes (97.2%) N = 106
5	Create construction project schedules.	CME 403	Assignment 1 - assemble a full critical path method (CPM) schedule for house construction project	DA	Siek	Yes (98.3%) N = 59
6	Analyze professional decisions based on ethical principles.	CME 305	Assignment 5 – analyze case studies and make decisions based on ethics	DA	Jang	Yes (88.5%) N = 52
7	Analyze construction documents for planning and management of construction processes.	CME 200	Assignment 5 – navigate independently through Porject Drawings and Specification of As-built project Exam 3 – assess construction management process and analyzing document	DA	Banawi	Yes (82.9%) N = 70
8	Analyze methods, materials, and	CME 301	Assignment 4 – four problems	DA	Asa	Yes (97.4%)

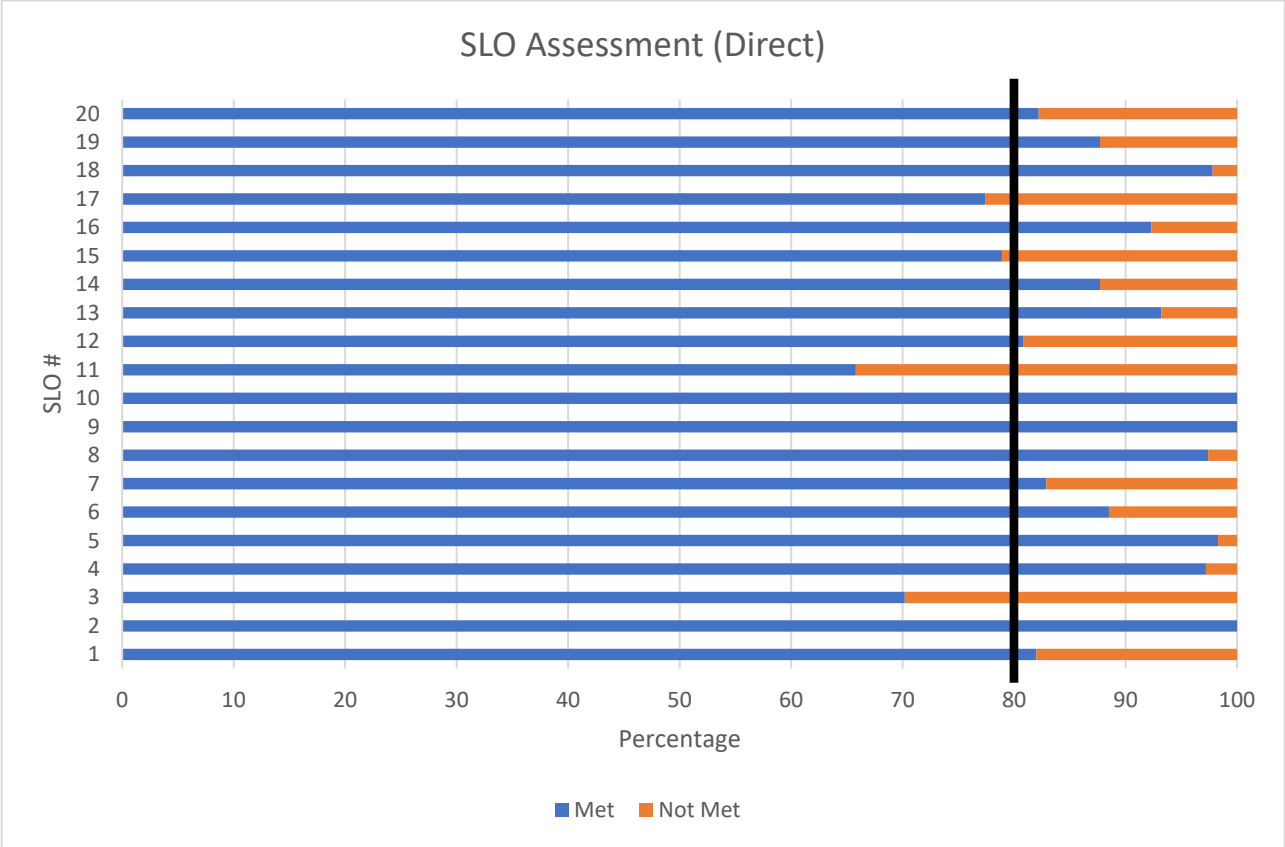
	equipment used to construct projects.		pertaining to analyzing equipment and scraping methods			N = 39
9	Apply construction management skills as a member of a multi-disciplinary team.	CME 488	Final Project – RFP document	DA	Banawi	Yes (100%) N = 41
10	Apply electronic-based technology to manage the construction process.	CME 212	Midterm – drawing components	DA	Mrazek	Yes (100%) N = 13
11	Apply basic surveying techniques for construction layout and control.	CME 204	Final exam - accurate layout of building corners and offsets utilizing calculations of angles, distances and Northings and Eastings	DA	Fuder	No (65.8%) N = 38
12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	CME 305	Final Exam (Q23) – comparison between BD and IPB delivery methods	DA	Jang	Yes (80.8%) N = 52
13	Understand construction risk management.	CME 403	Final project – create a full risk log of project documents and requirements	DA	Siek	Yes (93.2%) N= 59
14	Understand construction accounting and cost control.	CME 240	Assignment 3 – calculation of BCWS, BCWP, total cost at project completion, and project revenue	DA	Asa	Yes (87.8%) N = 49
15	Understand construction quality assurance and control.	CME 405	Final exam (Q1, Q21, Q24) – narrative answer on differences between quality	DA	Smith	No (78.9%) N = 57

			assurance and quality control			
16	Understand construction project control processes.	CME 305	Assignment 4 - analyzing and understanding the project's status in terms of cost and time	DA	Jang	Yes (92.3%) N = 52
17	Understand the legal implications of contract, common, and regulatory law to manage a construction project.	CME 315	Quizzes 8, 9, 10 - legal implications of contracts and specifications for the management of construction projects	DA	Le	No (77.4%) N = 159
18	Understand the basic principles of sustainable construction.	CME 431	Final Exam – sections B and C	DA	Yu	Yes (97.8%) N = 45
19	Understand the basic principles of structural behavior.	CME 250	Assignment 10 - Exam 3 – comprehensive final	DA	Gao	Yes (87.7%) N = 106
20	Understand the basic principles of mechanical, electrical and piping systems.	CME 421	Assignment 1 – assessment of mechanical systems Final Exam – assessment of electrical and plumbing systems	DA	Yu	Yes (82.2%) N = 90
1-20		CME 488	Pre-/Post-Program Survey	IA	Banawi	Varies (see graphs in Section IV)

II. Information Obtained from Assessment Measures

Direct Measurement: The program's goal is 80% of those assessed attain each SLO (direct measurement). This supplemental assessment indicates the program is above (16 SLOs), close/near (2 SLOs), or below (2 SLOs) to the 80% goal. The areas that need additional attention, program discussion, and adjustments are:

1) SLO 3 - Create a construction project safety plan.
2) SLO 11 - Apply basic surveying techniques for construction layout and control.
3) SLO 15 - Understand construction quality assurance and control.
4) SLO 17 - Understand the legal implications of contract, common, and regulatory law to manage a construction project.

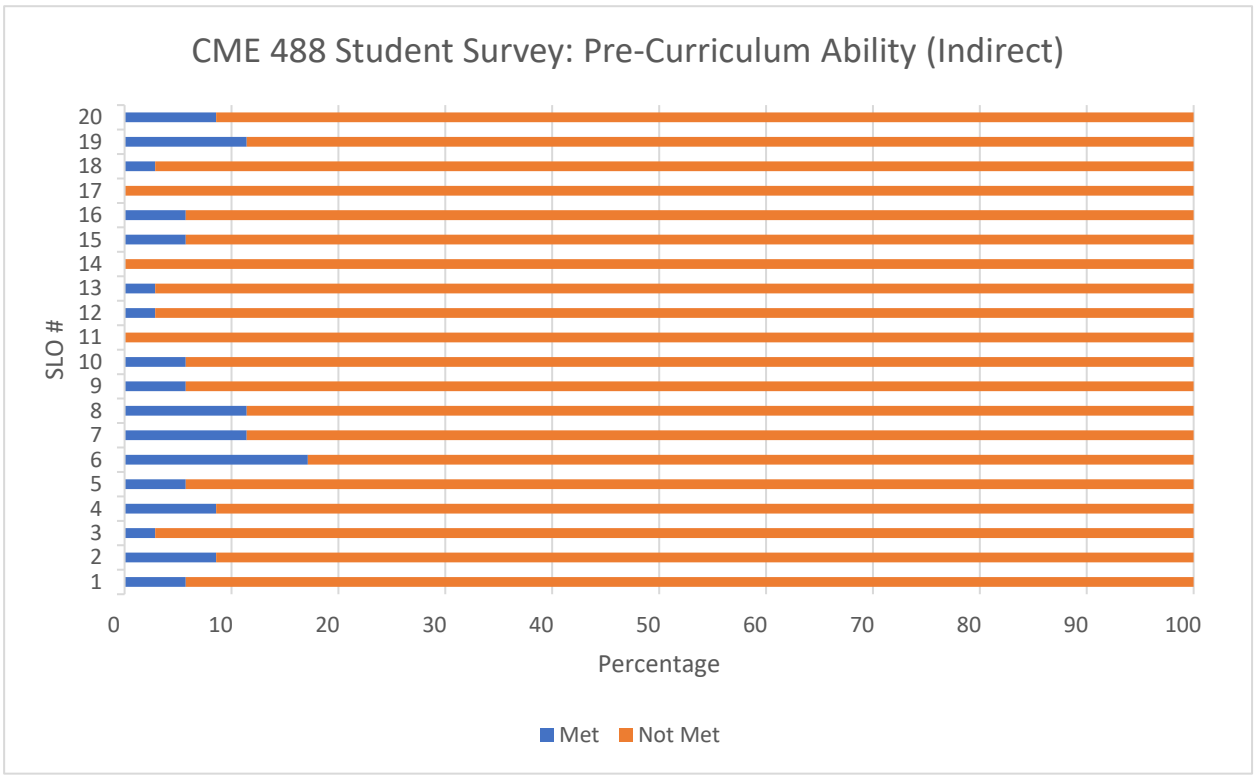


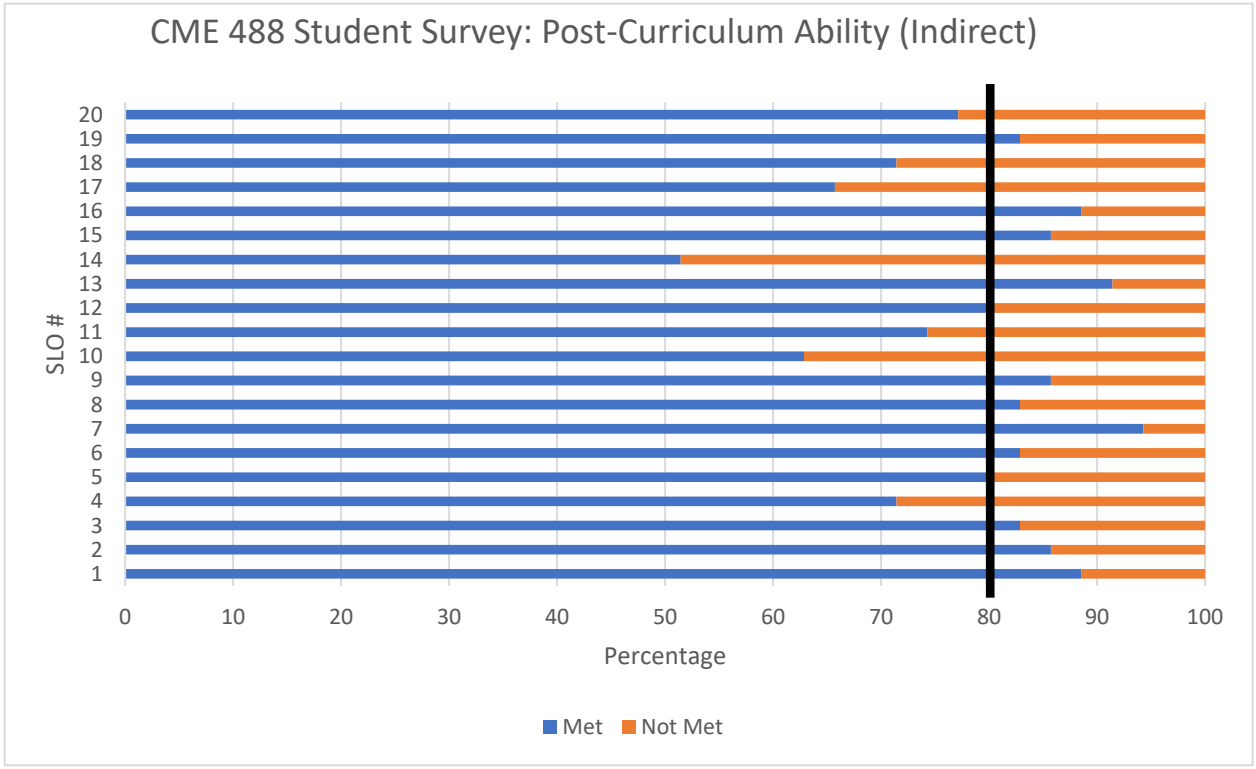
A discussion of actions taken (or to be taken) is included in Section III.

Indirect Measurement: The program's goal is 80% of those assessed attain each SLO (indirect measurement). While the direct assessment measurements indicated the need for attention in four SLO areas, the indirect measurement results indicate review and action may be needed in seven SLO areas:

1) SLO 4 – Create construction project cost estimates.
2) SLO 10 – Apply electronic-based technology to manage the construction process.
3) SLO 11 – Apply basic surveying techniques for construction layout and control.
4) SLO 14 – Understand construction accounting and cost control.
5) SLO 17 – Understand the legal implications of contract, common, and regulatory law to manage a construction project.
6) SLO 18 – Understand the basic principles of sustainable construction.
7) SLO 20 - Understand the basic principles of mechanical, electrical and piping systems.

The two overlapping SLOs (where the 80% goal was not met) between the direct and indirect measurements are SLOs 11 and 17.


CME 488 Student Survey: Pre-Curriculum Ability (Indirect)
SLO #
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
10
20
30
40
50
60
70
80
90
100
Percentage
Met
Not Met


CME 488 Student Survey: Post-Curriculum Ability (Indirect)
SLO #
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
10
20
30
40
50
60
70
80
90
100
Percentage
Met
Not Met

III. Actions Taken Based on Assessment

Direct Assessment - Individual instructors have reflected and provided course actions that are to be implemented within the specific courses used to assess the SLOs. In particular:

1) SLO 3 – At the course level: The instructions to the assignment will be revisited. Nearly 80% of the students did not include project specific safety information for the core areas that the safety plan should have covered. The analysis of supporting areas (ladders, aerial lifts, etc.) were also not well done suggesting some inexperience within the class of understanding all of the details needed to construct the project. The corrective action plan will include the development of an example of safety content for other areas in the project such as painting or insulation to demonstrate the sections that could be added.

   At the program level – the Program will reconsider the prerequisites to this course to include at least CME 380 where students receive exposure to reading construction plans.

2) SLO 11 – At the course level: This assessment shows a definite need to emphasize the need for accurate and precise measurements, accurate calculations and checking progress of calculations to ensure that errors and blunders are not perpetuated through to the end of the problem. More emphasis will be placed on understanding the need for accuracy and precision in both calulations and field labs during the semester *Example* - Create an RFI assignment that requires using an electronic tool such as XXXX to analyze drawings and specifications. Assess use of the tool to communicate a relevant question.

   At the program level – the Program will reassess how this course is taught as well review where in the curriculum these surveying skills are reinforced and practiced.

3) SLO 15 – 78.9% of the students achieved SLO 15; just short of the 80% goal.

   At the course level - A revisit into the lecture covering quality assurance and quality control will be conducted to ensure that proper discussion and information on the differences is covered appropriately. A similar type of question on the characteristics of each will be included in the Checkpoint assessments. Currently students only see this question on the final exam.

   At the program level – the Program will revisit SLO 15 after initial course adjustments.

4) SLO 17 – With the current assessment, SLO 17 fell just short of the 80% (77.4%) goal. An analysis of the direct assessment measures indicates the issue may be

a COVID-absence issue (for quizzes) rather than student preparation to succeed and attain the knowledge related to SLO 17.

At the course level – While COVID-related absence may be the main factor in missing the 80% goal, case studies will be added within the quizzes. The final exam should also include some questions to test students' understanding at the end of the course.

At the program level – no changes will be made at this point. The program will monitor this SLO in future semesters to determine if attainment was impacted by COVID absences.

Indirect Assessment – The program will schedule a faculty workshop following the spring 2022 semester to discuss the indirect measurement results as compared to the direct measurements. This pre-/post-survey correlates to past (previous years) senior exit surveys that have indicated many of the same shortcomings.

An analysis will be undertaken to review course content, pre-requisite scheme, and assessment tools to determine areas for improvement and/or modification.