

NDSU BSCM SLO Assessment Results (2022-2023)

Both direct and indirect measures were used for 20 SLO assessments during fall 2022 and spring 2023.

Indirect Measure SLO Assessment Results

The program SLOs were assessed during spring 2023 by surveying the graduating seniors in the CM capstone class (CM&E488) and the CM Alumni. The performance criteria goal for the indirect assessment (minimum acceptable level) was set as 70% (3.5/5 using a 5-point Likert scale) for each SLO. The senior 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: (about ability) 1: none, 2: little, 3: moderate, 4: functional, 5: proficient. A 70% (3.5) or above on the Likert Scale (1-5) was considered attainment of the SLO. Figure 1 shows the result of the post-survey. Similarly, the alumni survey asked the alumni to consider his/her level of ability, regarding educational preparedness and workplace performance, for each SLO. The 5-point Likert scale was: (about ability) 1 = not at all and 5 = very well. A 70% (or 3.5) or above on the Likert Scale (1-5) was considered attainment of the SLO. Figure 2 shows the results of the alumni survey. Detailed values can be found in Table 1.

Table 1. Results of Indirect Measure Assessment of SLOs

Indirect Measure	Student Learning Outcomes (SLO)									
	1	2	3	4	5	6	7	8	9	10
Senior Survey	4.50	5.00	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.00
Alumni Survey	4.39	4.14	3.64	3.95	4.19	4.26	4.24	3.98	4.10	3.64

Indirect Measure	Student Learning Outcomes (SLO)									
	11	12	13	14	15	16	17	18	19	20
Senior Survey	4.00	4.50	4.50	4.00	4.00	4.50	3.50	4.00	4.50	3.50
Alumni Survey	3.43	4.00	4.00	3.93	3.98	3.95	4.02	3.45	3.95	3.60

The results of surveys show meeting the goal (Yes, $\geq 70\%$ (3.5/5)) on all 20 SLOs from graduating seniors, while meeting the goal (Yes, $\geq 70\%$ (3.5/5)) on SLO 1-10, 12-17, 19 and 20, but slightly not meeting the goal on SLO 11 (3.43/5) and SLO18 (3.45/5).

Direct Measure SLO Assessment Results

The program SLOs were assessed during the 2022-2023 academic year. Table 1 shows a detailed list of courses used, as well as the methods of assessment, for each SLO. Table 1 also shows the assessment results/attainment summary for each SLO. The goal (minimum acceptable level) for the direct assessment was 80% of those assessed achieved the specific SLO. The threshold for the attainment of an SLO was 70% on the assessment method (instrument). Table 2 shows the course assessment results for the SLO mapping.

The results in Table 2 show meeting the goal (Yes, $\geq 80\%$) on SLO 1-10, 12-15, and 17-20, but not meeting the goal (No, $< 80\%$) on SLO 11, and 16.

Results of Assessment Measures Analysis

The program's goal is for 80% of those assessed to attain each SLO with direct measures. The assessment indicates the program is above (18 SLOs), or below (2 SLOs) to the 80% goal from direct measures. The two areas that need additional attention, program discussion, and adjustments are.

- SLO 11 - Apply basic surveying techniques for construction layout and control.
- SLO 16 - Understand construction project control processes.

The program's goal is for 70% of those assessed to attain each SLO with indirect measures. The indirect measurement results indicate review and action may also be needed in two SLO areas, one of which is lining up with those from direct measure assessment, as highlighted. The overlapping SLO (where the goal was not met) between the direct and indirect measurements (SLO 11) needs more attention.

- **SLO 11 - Apply basic surveying techniques for construction layout and control.**
- SLO 18 - Understand the basic principles of sustainable construction.

Additionally, SLO 17 and 20 are on the board line and need to be watched.

- SLO 17 - Understand the legal implications of contract, common, and regulatory law to manage a construction project.
- SLO 20 - Understand the basic principles of mechanical, electrical and piping systems.

Table 2. Direct measure assessment for each SLO (2022-2023).

SLO #	SLO	Courses	Assessment Methods	Course Assessment Result (Y/N met goal* / N=sample size)	Assessment Summary (Y/N met goal*)
1	Create written communications appropriate to the construction discipline.	CM&E111	Ass01-resume	Yes = 83.3%, 80.0%, 100% and N = 42,20,22	Yes
		CM&E203	Final project report	Yes = 100% and N = 52	
		CM&E204	Lab report01	Yes = 79.2% and N = 53	
		CM&E212	Assi01,Q2; Assi02-07 Midterm exam	Yes = 81.5% and N = 87	
		CM&E260	Lab report01-04	Yes = 93.9% and N = 49	
		CM&E403	Assi03	Yes = 94.1% and N = 34	
		CM&E421	Final project report	Yes = 97.6% and N = 41	
		CM&E431	Final project report	Yes = 98.1% and N = 51	
		CM&E453	Lab report06-07	Yes = 100% and N = 39	
		CM&E488	Ass02,Q3; Assi03,Q10 Final proposal	Yes = 91.7%, 100% and N = 12, 29	
2	Create oral presentations appropriate to the construction discipline.	CM&E203	Final project presentation	Yes = 98% and N = 52	Yes
		CM&E403	In-class activity06	Yes = 79.4% and N = 34	
		CM&E421	Final project presentation	Yes = 97.6% and N = 41	
		CM&E431	Final project presentation	Yes = 98.0% and N = 51	
		CM&E488	Final proposal presentation	Yes = 100%, 100% and N = 12,29	
3	Create a construction project safety plan.	CM&E405	Assi05,Q1	Yes = 84.4% and N = 44	Yes
		CM&E488	Proposal safety plan Assi04	Yes = 8.3%, 100% and N = 12,29	

4	Create construction project cost estimates.	CM&E380	Exam03	Yes = 100% and N = 54	Yes
		CM&E488	Proposal estimate and cost Assi02	Yes = 50%, 100% and N = 12,29	
5	Create construction project schedules.	CM&E403	Assi01	Yes = 91.2% and N = 34	Yes
		CM&E488	Proposal schedule Assi03	Yes = 25%, 100% and N = 12,29	
6	Analyze professional decisions based on ethical principles.	CM&E111	Assi07-ethic report	Yes = 88.1%, 85.0%, 100% and N = 42,20,22	Yes
		CM&E305	Assi05	Yes = 84.8% and N = 46	
		CM&E315	Assi03	Yes = 92.5% and N = 53	
		CM&E403	In-class activity03	Yes = 88.2% and N = 34	
		CM&E450	Assi09 Exam02, Q21,Q22	Yes = 97.7% and N = 44	
		CM&E453	Final exam, Q16	Yes = 97.4% and N = 39	
7	Analyze construction documents for planning and management of construction processes.	CM&E200	Exam03 Final exam, Q11,13,15,17	Yes = 100%, 97.1% and N = 55,35	Yes
		CM&E488	Proposal schedule narrative	Yes = 25% and N = 12	
8	Analyze methods, materials, and equipment used to construct projects.	CM&E203	Exam01, Q18 Exam02, Q23 Final exam, Q20	Yes = 94% and N = 53	Yes
		CM&E260	Assi01-04	Yes = 91.8% and N = 49	
		CM&E301	Exam02	Yes = 83.9% and N = 56	
		CM&E450	Assi10 Quiz04-05 Exam02, Q15,Q20	Yes = 97.7% and N = 44	
		CM&E453	Final exam, Q13-15	Yes = 97.4% and N = 39	

		CM&E488	Proposal project approach narrative	Yes = 41.7% and N = 12	
9	Apply construction management skills as a member of a multi-disciplinary team.	CM&E488	Assi01,Q1.1-1.7	Yes = 100%, 100% and N = 12,29	Yes
10	Apply electronic-based technology to manage the construction process.	CM&E111	Assi06-MS Project schedule	Yes = 71.4%, 50%, 100% and N = 42,2022	Yes
		CM&E212	Final project	Yes = 96% and N = 87	
		CM&E403	Assi04	Yes = 97.1% and N = 34	
		CM&E488	Proposal presentation Assi01	Yes = 100%, 100% and N = 12,29	
11	Apply basic surveying techniques for construction layout and control.	CM&E204	Assi05	Yes = 54.7% and N = 53	No
12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	CM&E111	Assi02,Q1 – construction professionals	Yes = 100% and N = 22	Yes
		CM&E305	Exam01,Q6,13,16 Final exam, Q23	Yes = 63.0% and N =46	
		CM&E315	Exam01,Q16-17,Q24,Q26) Exam02,Q16, Q19-20,Q24)	Yes = 98.1% and N = 53	
		CM&E488	Assi01	Yes = 100% and N = 29	
13	Understand construction risk management.	CM&E403	In-class activity05	Yes = 85.3% and N = 34	Yes
14	Understand construction accounting and cost control.	CM&E240	Assi03	Yes = 86.4% and N = 44	Yes
		CM&E403	Starting fall 2023	Yes = n/a and N =	
15	Understand construction quality assurance and control.	CM&E405	Midterm exam,Q16 Assi05,Q2	Yes = 100% and N = 44	Yes
16	Understand construction project control processes.	CM&E305	Assi04 Final exam,Q14	Yes = 31.9% and N = 46	No
		CM&E403	Assi05	Yes = 91.2% and N = 34	

17	Understand the legal implications of contract, common, and regulatory law to manage a construction project.	CM&E315	Exam01,Q22, Q23) Exam02,Q17, Q18 Exam03,Q18-19, Q21-23, Q26	Yes = 90.6% and N = 53	Yes
18	Understand the basic principles of sustainable construction.	CM&E431	Midterm exam, sections B,C Final exam, sections B,C	Yes = 98.0% and N = 51	Yes
19	Understand the basic principles of structural behavior.	CM&E250	Assi01-10 Quiz01, 02 &04 Exam01-03	Yes = 94.7% and N = 57	Yes
		CM&E260	Final exam	Yes = 85.7% and N = 49	
		CM&E450	Assi01-08 Quiz01-03 Exam01, Exam02, Q1-14, 16-19,23-26	Yes = 95.5% and N = 44	
20	Understand the basic principles of mechanical, electrical and piping systems.	CM&E421	Midterm exam, sections C,D Final exam, sections C,D,E,F,G	Yes = 82.9% and N = 41	Yes

Note: "Meet" means $\geq 80\%$ of assessed attained SLO goal (the threshold for attainment of an SLO was 70% on the assessment method)