

Haskell & Irene Lemon Construction Science Division
SLO Assessment Outcomes
2017-2018 academic year

This document serves as the assessment report for the Bachelor of Science – Construction Science program for Spring 2018. This report is based on the undergraduate assessment and academic quality plan for the Construction Science Division, as approved by the CNS faculty in February 2018.

1. **Faculty involved with the program** – The following table lists the faculty teaching in the program in the 2017/2018 academic year, as well as the SLOs assessed in their courses.

Course	Name	Instructor	SLO assessed/Notes
Fall 2017			
CNS 1112	Cultures of Collaboration	Bigelow	Discontinued
CNS 2363	Materials and Methods I	Bloom	9
CNS 2211	Sustainability	Blooms	18
CNS 3103	Construction Surveying	Reyes	11
CNS 4193	Structures I	Shadravan	19
CNS 3413	Construction Communication	McCuen	2
CNS 3443	Electrical Systems	Perrenoud	20
CNS 3512	Cost Estimating	Ghosh	4,6
CNS 3612	Project Controls Lab	Ghosh	No SLO assessed
CNS 3812	Project Planning & Scheduling	Ghosh	5
CNS 4133	BIM for Constructors	McCuen	10
CNS 4523	Pre-Construction Services	McCuen	12,13,15
CNS 4612	Soils & Foundations	Marakah	No SLO assessed
Spring 2018			
CNS 1213	Computers in Construction	Rahman	No SLO assessed
CNS 2833	Materials & Methods II	Bloom	8
CNS 2433	Mechanical Systems	Perrenoud	20
CNS 2812	Construction Fundamentals Lab	Bloom	7, 15
CNS 2813	Construction Docs & Quantity Survey	Ghosh	7
CNS 4233	Structures I	Holliday	19, None submitted
CNS 3823	Project Controls Management	Reyes	14,16
CNS 3883	Construction Safety	Reyes	3
CNS 4153	Legal Issues in Construction	Laws	17
CNS 4213	Design Build Principles	McCuen	No SLO assessed
CNS 4303	Lean Construction Management	Ghosh	No SLO assessed
CNS 4403	Leadership	Perrenoud	No SLO assessed
CNS 4970	Construction Education	Bigelow	No SLO assessed
CNS 4993	Construction Science Capstone	McCuen	1,4,5

2. **Course notebooks** - A sample of course notebooks were collected in the 2017/18 academic year. Following is a summary of the notebooks collected.

- i. Total number of course notebooks collected for the 2017/18 academic year: 12 (notebooks were not requested for the Fall semester because of pending assessment changes). Following is the list of courses for which course notebooks were collected:
 - (1) Fall 2017: CNS 2211, CNS 310 (2 courses).
 - (2) Spring 2018: CNS 2433, CNS 2812, CNS 2813, CNS 2833, CNS 3823, CNS 3883, CNS 4153, CNS 4303, CNS 4403, CNS 4993 (10 courses).
 - ii. Total number of courses for which course notebooks were not collected for the 2017/18 academic year: 12. The following is the list of courses:
 - (1) Fall 2017: CNS 1213, CNS 2363, CNS 3413, CNS 3443, CNS 3512, CNS 3612, CNS 3812, CNS 4613, CNS 4133, CNS 4523, CNS 4233 (12 courses)
 - (2) Spring 2018: None.
 - iii. All course notebooks are available in electronic format. The intent is to archive these notebooks yearly.
- (2) Each course notebook was expected to consist of the following materials:
- i. Course Syllabus (following University of Oklahoma requirements)
 - ii. ACCE SLO Summary Form
 - iii. CNS Division Course Summary Form
 - iv. Course lectures or other presentation materials
 - v. Course assignments and tests with grading rubrics or keys
 - vi. 1 example of student work for each assignment (student names removed)
 - vii. Any other materials the instructor deems appropriate to include
3. **Direct Assessment of Student Learning Outcomes and Course Summaries** - Instructors were asked to submit information to evaluate their courses and collect assessment data for SLOs. The following are the responses collected, organized by the course (Assessment information organized by SLO is provided in section 5):
- (1) CNS 2211 – The instructor uses quiz #4 to assess SLO #18. Out of 61 students, the average grade on the quiz was 83.6%. The grade distribution in the course was: A – 50, B – 7, C – 3, D – 0, F – 1.
The instructor did not have suggestions for improvement for next year.
 - (2) CNS 2433 – For SLO #20, the instructor uses exam #2 to assess mechanical system knowledge. Out of 43 exams taken, the average grade was 78%. The instructor used exam #3 to assess plumbing system knowledge. Out of 43 exams, the average grade was 83%. The grade distribution in the course was: A – 6, B – 25, C – 10, D – 0, F – 2.
The instructor suggested the following improvement for next year: Bring in more hands on activities related to MEP systems & Remove textbook, students don't read it. I am hoping to identify new reading material.
 - (3) CNS 2812 – The instructor uses journal entries documenting work performed on-site each week to assess SLO #8. Out of 49 students enrolled in the course the average grade was 88.7%. The grade distribution in the course was: A – 46, B – 2, C – 3, D – 1, F – 0.
The instructor did not have suggestions for improvement for next year.
 - (4) CNS 2813 – The instructor uses two exams (exam 1 and the final exam) to assess SLO #7. Out of 50 students, the average grade on the two exams was 76.5%. The grade distribution in the course was: A – 12, B – 23, C – 15, D – 0, F – 0.
The instructor suggested the following improvement for next year: Coordinate more with the Fundamentals Lab and have some of the QTO assignments tie with the lab assignments.

- (5) CNS 2833 – The instructor uses the mid-term exam to assess SLO #8. Out of 48 students the average score was 80.8%. The grade distribution in the course was: A – 30, B – 12, C – 3, D – 3, F – 0.
The instructor suggested the following improvement for next year: Would benefit from proper coordination and sequencing between Materials and Methods I topics.
- (6) CNS 3103 – The instructor uses a combination of lab assignments and two exams to assess SLO #11. Out of 31 students the average score from these labs and exams was 84.3%. The grade distribution in the course was: A – 10, B – 14, C – 6, D – 0, F – 1.
The instructor suggested the following improvement for next year: Spend an additional lab with the total station to better cover some horizontal layout concepts.
- (7) CNS 3823 – The instructor uses a combination of homework, exam #2, and the final exam to assess SLO #14. Out of 31 students the average grade on these materials was 87.6%. For SLO #16 the instructor uses exam #1 for assessment. Out of 31 students the average grade was 81%. The grade distribution in the course was: A – 10, B – 16, C – 5, D – 0, F – 0.
The instructor suggested the following improvement for next year: Expanded use of digital document and cost control tools (such as Procore)
- (8) CNS 3883 – The instructor uses the final project to assess SLO #3. Out of 31 students the average score on the project was 93%. The grade distribution in the course was: A – 10, B – 16, C – 0, D – 0, F – 0.
The instructor suggested the following improvement for next year: Incorporate the OSHA 30 outreach training into the course.
- (9) CNS 4153 – The instructor uses a combination of two exams (a midterm and a final) to assess SLO #17 out of 25 students the average score on the two exams was 84%. The grade distribution in the course was: A – 5, B – 17, C – 3, D – 0, F – 0.
The instructor suggested the following improvement for next year: If there is a budget for it, preparing short videos of the classes, illustrating some of the concepts discussed in class, would be very helpful.
- (10) CNS 4303 – This course is an elective, as such SLOs are not assessed in this course. Out of 17 students enrolled, the grade distribution in the course was: A – 7, B – 10, C – 0, D – 0, F – 0.
The instructor suggested the following improvement for next year: Considering the class size and the discussion format of the course, a smaller classroom where the students can gather around each other in groups is more suitable for this course. I typically use multiple simulation exercises to explain the lean principles; will ask the students to submit reflective essays after each simulation to reinforce the principles and make them contemplate the possible implications in traditional construction management.
- (11) CNS 4403 – This course is an elective, as such SLOs are not assessed in this course. Out of 13 students enrolled, the grade distribution in the course was: A – 13, B – x, C – x, D – x, F – x.
The instructor suggested the following improvement for next year: Make this a required class, so all CNS students learn how to develop their leadership potential.
- (12) CNS 4213 – This course is an elective, as such SLOs are not assessed in this course. Out of x students enrolled, the grade distribution in the course was: A – x, B – x, C – x, D – x, F – x.
The instructor did not have suggestions for improvement for next year.
- (13) CNS 4993 – The instructor uses the capstone final project to assess SLOs #1, #4, & #5. Out of 20 students the average grade for SLO #1 was 78%, the average grade for SLO #4 was 89%, the average grade for SLO #5 was 74%. The grade distribution in the course was: A – 102, B – 6, C – 4, D – 0, F – 0.
The instructor suggested the following improvement for next year: Each year the course project requirements and deliverables are developed with input from an industry partner to better align the project with industry expectations in terms of content and format. Based on my experience,

there are differences between the academic and industry expectations for content and format. Industry content is delivered in a format unlike students have seen before, so it is often a challenge for students to meet the requirements. Linking typical industry deliverables with the academic deliverables through more exposure to industry deliverables would be beneficial.

4. **Indirect Assessment of Student Learning Outcomes via exit surveys** - Each graduating student was given a departmental exit survey, and was asked to fill it out online. Out of the 20 students who graduated in May 2018, 20 responses were collected. Accounting for a 100% response rate, for this class. Students were asked how confident they are in their ability to apply each SLO on a 4-point scale. The table below summarizes the student responses regarding each SLO. An average score out of 5 is provided as well as the number of responses for each level of confidence ("Very Confident", "Confident", "Somewhat Confident", and "Not Confident")

SLO	Average	Very Confident	Confident	Somewhat Confident	Not Confident
#1 Written Communication	3.4	10	8	2	0
#2 Oral Presentations	3.2	7	10	3	0
#3 Safety Plan	3.1	6	10	4	0
#4 Cost Estimates	3.2	8	8	4	0
#5 Project Schedules	3.1	6	10	4	0
#6 Ethics	3.35	9	9	2	0
#7 Documents	3.4	10	8	2	0
#8 Materials & Methods	3.15	6	11	3	0
#9 Multi-Disciplinary Team	3.35	9	9	2	0
#10 Electronic Technology	3.2	8	8	4	0
#11 Surveying	3.15	7	9	4	0
#12 Project Delivery	3.25	8	9	3	0
#13 Risk Management	3.15	6	11	3	0
#14 Acct. & Cost Control	3.1	7	8	5	0
#15 QA/QC	3.15	7	9	4	0
#16 Project Control	3.15	7	9	4	0
#17 Legal	3.1	6	10	4	0
#18 Sustainable	2.7	4	7	8	1
#19 Structural Principles	3	5	10	5	0
#20 MEP	3	7	6	7	0

5. **Student Learning Outcomes Summary** – instructors were asked to submit what they used to assess SLOs and the outcomes of that assessment. The Division of Construction Science Undergraduate Assessment and Academic Quality Plan (approved by faculty 2/2018) establishes a target of 70% or higher for all SLO assessments. For the SLO data collected in 2017/2018 the target was met for all direct SLO assessments. For Indirect SLO assessment the 70% target was met for all SLOS except #18. The following are the direct and indirect assessment data for each SLO.

SLO #1: *Create written communications appropriate to the construction discipline*

- In CNS 4993, the instructor uses the final project to assess SLO #1. Out of 20 students the average grade for the SLO #1 portion of the project was a 78%.
- An average score of 3.4 (85%) resulted from indirect assessment.

SLO#2: *Create oral presentations appropriate to the construction discipline*

- No direct assessment SLO Data for 2017/2018
- An average score of 3.2 (80%) resulted from indirect assessment.

SLO#3: *Create a construction project safety plan*

- In CNS 3883, the instructor uses the final project to assess SLO #3. Out of 31 students the average score on the project was 93%.
- An average score of 3.1 (77.5%) resulted from indirect assessment.

SLO#4: Create construction project cost estimates

- In CNS 4993, the instructor uses the final project to assess SLO #4. Out of 20 students the average grade for the SLO #4 portion of the project was 89%.
- An average score of 3.2 (80%) resulted from indirect assessment

SLO #5: Create construction project schedules

- In CNS 4993, the instructor uses the final project to assess SLO #5. Out of 20 students the average grade for the SLO #5 portion of the project was 74%.
- An average score of 3.1 (77.5%) resulted from indirect assessment.

SLO#6: Analyze professional decisions based on ethical principles

- No direct assessment SLO Data for 2017/2018
- An average score of 3.35 (83.75%) resulted from indirect assessment.

SLO#7 Analyze construction documents for planning and management of construction processes

- In CNS 2813 The instructor uses two exams (exam 1 and the final exam) to assess SLO #7. Out of 50 students, the average grade on the two exams was 76.5%.
- An average score of 3.4 (85%) resulted from indirect assessment.

SLO#8 Analyze methods, material and equipment used to construction projects

- In CNS 2812, the instructor uses journal entries documenting work performed on-site each week to assess SLO #8. Out of 49 students enrolled in the course the average grade was 88.7%.
- In CNS 2833, the instructor uses the mid-term exam to assess SLO #8. Out of 48 students the average score was 80.8%.
- An average score of 3.15 (78.75%) resulted from indirect assessment.

SLO#9 Apply construction management skills as a member of a multi-disciplinary team

- No direct assessment SLO Data for 2017/2018
- An average score of 3.35 (83.75%) resulted from indirect assessment.

SLO #10 Apply electronic-based technology to manage the construction process

- No direct assessment SLO Data for 2017/2018
- An average score of 3.2 (80%) resulted from indirect assessment

SLO #11 Apply basic surveying techniques for construction layout and control

- In CNS 3101, the instructor uses a combination of lab assignments and two exams to assess SLO #11. Out of 31 students the average score from these labs and exams was 84.3%.
- An average score of 3.15 (78.75%) resulted from indirect assessment.

SLO #12 Understand different methods of project delivery and the roles and responsibilities of all

- No direct assessment SLO Data for 2017/2018
- An average score of 3.25 (81.25%) resulted from indirect assessment.

SLO #13 Understand construction risk management

- No direct assessment SLO Data for 2017/2018
- An average score of 3.15 (78.75%) resulted from indirect assessment.

SLO #14 Understand construction accounting and cost control

- In CNS 3823 The instructor uses a combination of homework, exam #2, and the final exam to assess SLO #14. Out of 31 students the average grade on these materials was 87.6%
- An average score of 3.1 (77.5%) resulted from indirect assessment.

SLO #15 Understand construction quality assurance and control

- No direct assessment SLO Data for 2017/2018
- An average score of 3.15 (78.75%) resulted from indirect assessment.

SLO #16 Understand construction project control processes

- In CNS 3823, the instructor uses exam #1 to assess SLO #16. Out of 31 students the average grade was 81%.
- An average score of 3.15 (78.75%) resulted from indirect assessment.

SLO #17 Understand the legal implications of contract, common and regulatory law to manage a construction project

- In CNS 4153, the instructor uses a combination of two exams (a midterm and a final) to assess SLO #17. Out of 25 students the average score on the two exams was 84%.
- An average score of 3.1 (77.5%) resulted from indirect assessment.

SLO #18 Understand the basic principles of sustainable construction

- In CNS 2211, the instructor uses quiz #4 to assess SLO #18. Out of 61 students, the average grade on the quiz was 83.6%.
- An average score of 2.7 (67.5%) resulted from indirect assessment.

SLO #19 Understand the basic principles of structural behavior

- No direct assessment SLO Data for 2017/2018
- An average score of 3 (75%) resulted from indirect assessment

SLO #20 Understand the basic principles of mechanical, electrical, and piping systems

- 2433 the instructor uses exam #2 to assess mechanical system knowledge. Out of 43 exams taken, the average grade was 78%. The instructor used exam #3 to assess plumbing system knowledge. Out of 43 exams, the average grade was 83%.
- An average score of 3 (75%) resulted from indirect assessment

Of the assessment data collected, indirect assessment of SLO #18 *Understand the basic principles of sustainable construction* was the only SLO that did not meet the benchmark of 70%. The division has addressed this shortcoming. The graduating seniors from whom that indirect response came were the first group to take CNS 2211 Sustainability, the course delivery has been changed from the webcast format to a traditional lecture format. It is anticipated that assessment results for that course will be above the benchmark in 2018/2019.

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