

**Michigan Technological University
School of Technology**

**Construction Management
Assessment Report**

2015-16 Academic Year

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Construction Management Program – Continuous Improvement Plan

The purpose of the CMG Continuous Improvement Plan is to have a well-documented process for assessing and evaluating the extent to which program and curriculum improvement is being achieved. Improvement is measured using Goals and Objectives that have been established according to the Mission Statement for the Construction Management program. The Mission Statement, Goals, and Objectives are similar for all programs within the School of Technology as these were established according to the Michigan Tech University Strategic Plan.

The Continuous Improvement Plan requires evaluation of performance for specific goals and objectives that are outlined in the Mission and Goals statement (see next page). Included in the plan is an Outcomes Assessment Program to measure the performance of students and graduates with regard to specific Program Educational Objectives (PEOs) and Student Learning Outcomes (SLOs) (previously identified as Program Outcomes, but wording changed to match ACCE accreditation guidelines).

The PEOs describe the attributes that we aspire for our graduates to attain within the first several years following graduation from Michigan Tech. The assessment tools used to measure achievement of these attributes include survey results conducted by the University Career Center, alumni surveys, employer surveys, and input from our Industrial Advisory Board.

The SLOs describe the learning outcomes that we expect our CMG students to achieve by the time they graduate from Michigan Tech. These outcomes are evaluated using course assessment, student evaluations, senior exit surveys, and senior project evaluations.

The process and the most recent results (2015-16) are described in detail in this report.

In addition to the assessment requirements for program accreditation, the University has also established a set of University Student Learning Goals (USLGs) that apply to all programs. A complete description of the USLGs and Assessment at Michigan Tech is included as Appendix C in this report. These goals were established in 2012 and the reporting process began in fall 2013. The reporting cycle is indicated below:

- Fall 2013: USLG 1 – Disciplinary Knowledge
 - Select two discipline specific topics for initial assessment (2012-13).

- Fall 2014: USLG 1 – Disciplinary Knowledge
 - Complete the cycle for the two topics from 2013 to evaluate the continuous improvement action taken.
 - Select another new discipline specific topic for initial assessment (2013-14).USLG 5 – Communication
 - Select a topic for initial assessment (2013-14).

- Fall 2015: USLG 1 – Disciplinary Knowledge
 - Complete the cycle for the new topic selected last year.USLG 5 – Communication
 - Complete the cycle for the topic selected last year.

The 2015 USLG Assessment Report is included as Appendix B in this report.

Mission Statement:

The mission of the MTU Construction Management program is to provide a quality and current education that will prepare students for professional careers in the construction industry. Students will be employable upon graduation and be prepared to grow professionally and be productive citizens in a global society.

Goals: (Update for 2015-16 Academic Year)

1. Attract and support world-class and diverse faculty, staff, and students.

- 1.1. Provide an outstanding work environment and support for faculty and staff.
Metric: Benchmark salary and compensation package.
- 1.2. Attract a bright, motivated, and diverse student body.
Metrics: - Target average GPA of 2.75 and ACT of 22 for incoming students.
- Percent ethnicity and gender of students.
- 1.3. Provide exceptional facilities and an aesthetically pleasing environment.
Metric: Optimize use of resources, labs, and equipment.
- 1.4. Enhance learning, discovery, and engagement by continually upgrading the faculty and staff.
Metric: Add faculty member(s) as needed.

2. Deliver a distinctive and rigorous learning experience to prepare graduates for careers in the construction field and professional growth.

- 2.1 Provide dynamic experiential learning that integrates instruction, teamwork, and projects in undergraduate courses.
Metric: Outcomes Assessment Program.
- 2.2. Promote and encourage student engagement, learning, and civic responsibility.
Metric: Extracurricular opportunities and organizations such as NAHB, ASC, ETEC, and others.
- 2.3. Maintain ACCE accreditation.
Metric: Receive ACCE re-accreditation in spring 2018.

3. Maintain and expand the program to enhance the CMG faculty performance in learning, discovery, and engagement.

- 3.1. Encourage and support faculty engagement in industry and/or other professional development activities annually.
Metric: Industrial activities, research involvement, publications and other.
- 3.2. Promote technological education, economic development, and innovations regionally and nationally.
Metric: Industry relations, committee participation, speaking engagements, and other outreach efforts.

Goal 1: Attract and support world-class and diverse faculty, staff, and students.

Objective 1.1: Provide an outstanding work environment and support for faculty and staff.

Measurement: Benchmark salary and compensation package for construction management positions at other universities (Michigan State University, Ferris State University, Eastern Michigan University, etc.).

Outcome from Analysis: This has not been done yet.

Action Taken or To Be Taken: Conduct survey of other universities.

Disposition: Carry forward to 2016-17.

Objective 1.2: Attract a bright, motivated, and diverse student body.

Measurement: Determine average GPA (target 2.75) and ACT (target 22) scores of incoming freshmen students. Also, determine gender and ethnicity information (targets not established).

Outcome from Analysis: Data for incoming CMG freshmen for 2015-16 was not available due to the low numbers.

Action Taken or To Be Taken:

1. The CMG program needs to improve total enrollment while maintaining the above standards.

Disposition: Carry forward to 2016-17.

Goal 1: Attract and support world-class and diverse faculty, staff, and students.

Objective 1.3: Provide exceptional facilities and an aesthetically pleasing environment.

Measurement: Optimize use of resources, labs, and equipment.

Outcome from Analysis:

1. Computer labs in the School of Technology have all been upgraded to state-of-the-art with equipment and software. The rooms all have new furniture and carpeting.
2. Most classrooms have computers and technology for classroom presentations.
3. The materials testing labs are shared with the Civil Engineering department and all have current testing equipment and adequate facilities.

This is a recurring objective and the goal was achieved as much as possible for this year.

Action Taken or To Be Taken:

1. Continue to upgrade classrooms and computer labs as needed.
2. Continue to replace and upgrade lab testing equipment as needed.
3. Long term goal is to have a Construction Management Laboratory to consolidate the lab needs for materials testing, construction methods, and building utility systems.

Disposition: Carry forward to 2016-17.

Objective 1.4: Enhance learning, discovery, and engagement by continually upgrading the faculty and staff.

Measurement: Add one additional FTE faculty member by fall 2012.

Outcome from Analysis: This has been done.

Action Taken or To Be Taken: None required at this time.

Disposition: Continue to monitor student enrollment and expand the curriculum opportunities as much as possible.

Goal 2: Deliver a distinctive and rigorous learning experience to prepare graduates for careers in the construction field and professional growth.

Objective 2.1: Provide dynamic experiential learning that integrates instruction, teamwork, and projects in undergraduate courses.

Measurement: Continue implementation of our Outcomes Assessment Program with specific Program Educational Objectives and Student Learning Outcomes. The assessment program shall include evaluation of specific course objectives, graduate exit surveys, alumni surveys, and input from an Industrial Advisory Board.

Outcome from Analysis: The Outcomes Assessment Program has been set up and specific Program Educational Objectives (PEOs) and Student Learning Outcomes (SLOs) have been established. An initial Assessment Report was completed. The assessment included course evaluation by the instructor using specific measurements of student performance, student evaluations, graduate surveys, alumni surveys (first time), employer surveys (first time), and input from the Industrial Advisory Board (IAB).

ETEC

- Continue work on current, practical projects related to construction management.
This is a recurring objective and the goal was achieved for this year.

Action Taken or To Be Taken: Continue to implement the Outcomes Assessment Program and complete the assessment for every course used to measure the PEOs and the SLOs. The previously used Program Outcomes (POs) were expanded and modified to match ACCE-prescribed SLOs.

Disposition: Carry forward to 2016-17.

Objective 2.2: Promote and encourage student engagement, learning, and civic responsibility.

Measurement: Encourage extracurricular activities and student participation in organizations such as Husky Design and Construction (a Michigan Tech student organization) along with National Home Builders (NAHB), Associated Schools of Construction (ASC) – bid competition, engineering enterprise (ETEC), and others.

Outcome from Analysis:

- 57 Students (15 CMG students) involved in the Husky Design and Construction Association in 2015-16.
- 4 Students participated in the ETEC enterprise.
- 21 Students enrolled in the CMG program during the 2015-16 academic year.
- 34 Students attended the AGC Student Contractor Awareness (SCAN) night.
- ETEC students continued work on a plan to completely modernize the water treatment and distribution system at the Ford Forestry Center, a small community donated to Michigan Tech in 1954 by Henry Ford. They are investigating emerging technologies that might be used for the water system. ETEC is also assisting another enterprise in designing and estimating the construction of a parking deck.

This is a recurring objective and we consider this to be a moderately successful year.

Action Taken or To Be Taken: Continue to promote these extracurricular activities for CMG students.

Disposition: Carry forward to 2016-17.

Goal 2: Deliver a distinctive and rigorous learning experience to prepare graduates for careers in the construction field and professional growth.

Objective 2.3: Maintain ACCE accreditation.

Measurement: Receive ACCE re-accreditation in spring 2018.

Outcome from Analysis: The CMG program received ACCE accreditation in February 2013. The Year #1 and Year #3 Progress Reports were submitted and accepted by the ACCE.

Action Taken or To Be Taken: Prepare updated Self Study document and submit to ACCE in May 2017, in preparation for the ACCE site visit in the fall of 2017.

Disposition: This is a recurring objective and will be carried forward to 2016-17.

Goal 3: Maintain and expand the program to enhance the CMG faculty performance in learning, discovery, and engagement.

Objective 3.1: Encourage and support faculty engagement in industry and/or other professional development activities annually.

Measurement: Assess faculty engagement, research, and professional development activities.

Outcome from Analysis:

Faculty engaged in various professional activities including:

- Attended Rock Engineering Course, spring 2016.
- Participated in API Leadership training in Minneapolis along with two students.
- Participated in annual ACCE meetings.
- Workplace Safety & First Aid Training (MIOSHA and American Heart Association).
- Construction Industry related webinars (through CMAA, AGC, JJ Keller Online, Industrial Training International).

Faculty are members of and are involved with numerous professional organizations:

- American Council for Construction Education (ACCE).
- American Concrete Institute (ACI) – Concrete Examiner.
- State of Michigan Fire Safety Board.
- Houghton County Energy Efficiency Team, Community Advisory Board.
- American Society of Civil Engineers (ASCE).
- Construction Management Association of America (CMAA).
- American Society of Engineering Education (ASEE).
- National Association of Women in Construction.
- Associated General Contractors (AGC) – Student Advisor.

This is a recurring objective and the goal is considered to be achieved for this academic year.

Action Taken or To Be Taken: Continue to encourage and support faculty development activities.

Disposition: Carry forward to 2016-17.

Objective 3.2: Promote technological education, economic development, and innovations regionally and nationally.

Measurement: Faculty relations with industry, professional organizations, speaking engagements, and other outreach efforts.

Outcome from Analysis:

- Two ETEC Senior Design Projects were the foundation of a successful \$350K NSF Grant for capital improvements at the Ford Forestry Center.
- Faculty participated in Construction Career Days at several venues during the past academic year.

This is a recurring objective and is considered to be moderately successful for this academic year.

Action Taken or To Be Taken: Continue outreach efforts to promote technological education.

Disposition: Carry forward to 2016-17.

Construction Management, MTU

Program Educational Objectives

Construction is a very diversified industry and among the leaders in this vast enterprise is the professional constructor or construction manager. A construction manager has the skills and knowledge, acquired through education and experience, to participate in the planning, design, and construction of a project from inception to completion for the purpose of controlling time, cost, and quality. The Program Educational Objectives (PEOs) listed below describe the attributes that we aspire for our graduates to possess during the first several years following graduation:

PEO 1 Graduates will be well prepared for their first position in the construction management field.

PEO 2 Graduates will have an understanding of construction science topics as needed for their position.

PEO 3 Graduates will have an understanding of project management tasks including estimating, planning and scheduling, construction law, project safety, and other administrative procedures.

PEO 4 Graduates will have the communication skills to work effectively as part of a team.

PEO 5 Graduates will show a commitment to continuous improvement and lifelong learning by participating in professional societies, pursuing professional certifications, attending seminars or graduate studies.

Student Learning Outcomes

In order to achieve the above educational objectives, we expect our students to obtain the following Program Outcomes (SLOs) by the time that they graduate with their baccalaureate degree:

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

Program Educational Objectives Assessment Process

Table 4 shows the assessment tools used and the recent achievement standard (Academic Year 2015-16) for each of the Program Educational Objectives (PEOs).

Table 4: Assessed Program Educational Objectives

PROGRAM EDUCATIONAL OBJECTIVE	ASSESSMENT CRITERIA	RESULTS	USE OF RESULTS
<p>1. PEO1: Graduates will be well prepared for their first position in the construction management field.</p>	<p>1a. 70% of CMG graduates are currently employed in a degree related job as reported by the University job placement data.</p>	<p>1a. 100% reporting had a job. 82% of total had a job.</p>	<p>1a. The goal was met.</p>
	<p>1b. 70% of the CMG Alumni responding to the Alumni Survey will indicate they rate the overall quality of their CMG educational experience as good or better. (Survey Question #1)</p>	<p>1b. 89% of the CMG Alumni responding rated the quality as good or better (Avg rating = 4.3/5.0)</p>	<p>1b. The goal was met. Continue to monitor and strive for improvement.</p>
	<p>1c. 70% of CMG Alumni responding to the Alumni Survey will indicate they are: 1) currently employed in a position directly related to their education, 2) have accepted a job offer for a position directly related to their education, 3) have at one time worked in a position directly related to their education since graduation, or 4) currently pursuing an additional college degree.</p>	<p>1c. 100% of the CMG Alumni responding indicate they are currently employed.</p>	<p>1c. The goal was met. Continue to monitor on future surveys.</p>
	<p>1d. 70% of Employers responding to the Employer Survey will indicate they rate the overall quality of their CMG employees educational preparation from MTU as good or better. (Survey Question #1)</p>	<p>1d. 100% of Employers responding rated the quality as good or better (Avg rating = 4.3/5.0) <i>Only 4 responses received (20% response rate).</i></p>	<p>1d. The goal was met. However, we must significantly improve the response rate. This is true for all of the Employer feedback received, nevertheless, we will consider the results.</p>
	<p>1e. The CMG Industrial Advisory Board will meet at least annually to review and provide feedback to improve the quality of the program and preparation of our graduates.</p>	<p>1e. The CMG IAB met this academic year on 4/21/2016.</p>	<p>1e. See the IAB meeting minutes and Appendix A, Table A.7.</p>

<p><u>2. PEO2:</u> Graduates will have an understanding of construction science topics as needed for their position.</p>	<p>2a. On the Alumni and Employer Surveys, Survey Question #2 is directed to this objective. Alumni are asked to rate their ability and understanding as gained from their MTU education. The scale is:</p> <p><i>5 – Very Satisfied</i> <i>4 – Satisfied</i> <i>3 – Neutral</i> <i>2 – Dissatisfied</i> <i>1 – Very Dissatisfied</i></p> <p>The weighted average of responses on both surveys will be at least 3.50.</p>	<p>2a. <u>Survey Question #2</u> An understanding of basic structural design theory for steel, timber, concrete and masonry as needed in your work. Weighted Average = 4.40 (Alumni) Weighted Average = 4.30 (Employer)</p> <p><u>Alumni Survey</u> <i>18 responses</i> <i>18% response rate</i></p> <p><u>Employer Survey</u> <i>4 Responses (138)</i> <i>20% response rate</i></p>	<p>2a. The goal was met. Continue to monitor and strive for improvement. Also, we must improve the response rate (again).</p>
<p><u>3. PEO3:</u> Graduates will have an understanding of project management tasks including estimating, planning and scheduling, construction law, project safety, and other administrative procedures.</p>	<p>3a. On the Alumni and Employer Surveys, Survey Question #3 is directed to this objective. Alumni are asked to rate their ability and understanding as gained from their MTU education. The scale is:</p> <p><i>5 – Very Satisfied</i> <i>4 – Satisfied</i> <i>3 – Neutral</i> <i>2 – Dissatisfied</i> <i>1 – Very Dissatisfied</i></p> <p>The weighted average of responses will be at least 3.50.</p>	<p>3a. <u>Survey Question #3</u> An overall understanding of project managements tasks. Weighted Average = 4.50 (Alumni) Weighted Average = 4.20 (Employer)</p>	<p>3a. The goal was met.</p>

<p>4. <u>PEO4:</u> Graduates will have the communication skills to work effectively as part of a team.</p>	<p>4a. On the Alumni and Employer Surveys, Survey Question #4 is directed to this objective. Alumni are asked to rate their ability and understanding as gained from their MTU education. The scale is:</p> <p><i>5 – Very Satisfied</i> <i>4 – Satisfied</i> <i>3 – Neutral</i> <i>2 – Dissatisfied</i> <i>1 – Very Dissatisfied</i></p> <p>The weighted average of responses will be at least 3.50.</p>	<p>4a. <u>Survey Question #4</u> Have the communication skills, both oral and written, to work effectively as a team member. Weighted Average = 4.00 (Alumni) Weighted Average = 3.50 (Employer)</p>	<p>4a. The goal was met. Continue to monitor and strive for improvement.</p>
<p>5. <u>PEO5:</u> Graduates will show a commitment to continuous improvement and lifelong learning by participating in professional societies, pursuing professional certifications, attending seminars or graduate studies.</p>	<p>5a. On the Alumni and Employer Surveys, Survey Question #5 is directed to this objective. Alumni are asked to rate their ability and understanding as gained from their MTU education. The scale is:</p> <p><i>5 – Very Satisfied</i> <i>4 – Satisfied</i> <i>3 – Neutral</i> <i>2 – Dissatisfied</i> <i>1 – Very Dissatisfied</i></p> <p>The weighted average of responses will be at least 3.50.</p>	<p>5a. <u>Survey Question #5</u> An awareness of the value of continuous improvement and a commitment to lifelong learning. Weighted Average = 3.70 (Alumni) Weighted Average = 3.80 (Employer)</p>	<p>5a. The goal was met. Continue to monitor and strive for improvement.</p>

Student Learning Outcomes (SLO) Assessment Process

Each SLO is evaluated according to the metrics listed below:

- Course assessment (direct). Each course has Course Learning Outcomes (CLO) which are used to measure student achievement of a specific SLO. The level of achievement is set as:
 - Introduce – concepts are introduced and discussed in class.
 - Reinforce – students complete graded assignments.
 - Assessed – student achievement level is assessed.

Each faculty member evaluates their course at the end of the each semester. The results are tabulated and included in an annual Assessment Report for review by all faculty.

- Course assessment is completed at the end of each semester for every course. Assessment of the Student Learning Outcomes (SLOs), which summarizes the CLOs, is completed according to the following schedule:
 - Year #1 - 2014-15 – SLO # 4, 5, 11, 19
 - Year #2 - 2015-16 – SLO # 3, 8, 9, 20
 - Year #3 - 2016-17 – SLO # 7, 12, 13
 - Year #4 - 2017-18 – SLO # 1, 2, 6
 - Year #5 - 2018-19 – SLO # 14, 15, 16
 - Year #6 - 2019-20 – SLO # 10, 17, 18

This schedule allows complete assessment of each student learning outcome during the six-year accreditation cycle.

- Student Evaluations (indirect) – completed for each course, every semester.
- Senior Exit Survey (indirect) – completed in December and April each academic year.
- Senior Project Evaluation (direct) – completed in April each year.
- Alumni Survey (indirect) – conducted every three years (most recent in summer 2015).
- Employer Survey (indirect) – conducted every three years (most recent in summer 2015).

The following pages describe our Summary Assessments for 2015-16. This includes the SLO Summary along with the appropriate CLO Assessments for SLOs # 3, 8, 9, and 20.

SLO Assessment Form

Student Learning Outcome No.: 3

Assessment Year: 2015-16

SLO Statement: Create a construction safety plan.

Assessment Activity: Course Direct Other Direct Indirect

Course Direct:

List all Courses that apply to this SLO and indicate (I) Introduce, (R) Reinforce, or (A) Assess:

CMG 4210 (A)

CMG 4400 (R)

Brief Description: Measure student's understanding of safety issues and their ability to create a construction safety plan.

Target: - CMG 4400 – have the students understand how to read a contractor's site specific safety plan and recognize the OSHA requirements in the document.

- CMG 4210 – have the students create a project specific safety plan that would be acceptable by industry standards.

Summary of Results:

Course results for 2015-16 are shown on the following pages. A summary evaluation follows:

In CMG 4210, the students did create an acceptable project specific safety plan.

In CMG 4400, the students recognized and highlighted the many different portions of the provided site-specific safety plan that stated the OSHA 1926 requirements.

Indirect:

Brief Description:

- Evaluate student responses to Course Evaluations each semester.
- Evaluate responses on Senior Exit Surveys.
- Evaluate responses on Alumni and Employer Surveys.

Target: Minimum of 70% score on the average response rating.

Summary of Results:

- Specific course evaluation questions were not done.
- On the recent Senior Exit Survey, the average response to the question "I am able to create a construction safety plan" was 2.00/4.0.
- Average response to a similar question on the Alumni Survey (2015) was 3.80/5.0.
- Average response to a similar question on the Employer Survey (2015) was 4.50/5.0.

The graded assignments did meet the targeted results, but the indirect assessment results were mixed. The graduating seniors were not confident in their ability to create a safety plan, but the alumni and employer survey results were acceptable.

Action Planned for Improvement:

Description: Continue to cover OSHA 126 with more examples in CMG 4400. In CMG 4210, provide more examples of safety plans and discuss before requiring the students to create a plan.

Also, conduct the proper course evaluations with a specific question related to this SLO 3 on the form.

When: Fall 2016.

CLO Assessment Form

SLO No.: 3

Indicate I, R, or A: A

Course Number: CMG 4210

Course Name: Construction Project Management

Course Learning Outcome(s) Number and Description:

CLO 3 - Create a project specific construction safety plan

Assessment Activity: X Course Direct Indirect

Course Direct:

Brief Description:

As a lab assignment, student groups are directed to produce a project specific safety plan.

When: Fall 2015

Target:

To produce a project specific safety plan that would be acceptable by industry standards.

Results:

The safety plan produced was of a quality that was acceptable to the industry.

Course Indirect:

Brief Description:

When?

Target:

Results:

Action Planned for Improvement:

Description:

The assignment completed met the targeted results. However, it could have been completed more quickly and with more confidence. In the future provide more examples for them to assess and use as examples.

When?

Fall 2016

In Fall 2016, more examples of project specific safety plans were provided to the students. It did help them produce a plan quickly and confidently.

CLO Assessment Form

Student Learning Outcome No.: 3

Course Number: CMG 4400

Course Description: Construction Safety Management

Course Learning Outcome(s) Number and Description:

CLO #7 – be familiar with *JSA's* / *JHA's* and Worksite Safety Plans.

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Although the students did not write a safety plan (this is covered in another course), the students read through an actual 256 page site-specific safety plan (for the construction of a building on the University of Alaska Fairbanks campus) and noted where they recognized an OSHA 1926 regulation being addressed.

When: Fall 2015

Target: Students are able to identify where a requirement from OSHA 1926 is being addressed within a contractor's site-specific safety plan.

Results: The students did recognize many of the addressed OSHA 1926 requirements within the provided site-specific safety plan.

Course Indirect:

Brief Description:

When:

Target:

Results:

Action Planned for Improvement:

Description: Although most subparts of OSHA were covered in this course, look at possibly covering a few more and continue to have students examine/analyze additional site-specific safety plans (different projects).

When: Fall 2016.

SLO Assessment Form

Student Learning Outcome No.: 8

Assessment Year: 2015-16

SLO Statement: Analyze methods, materials, and equipment used to construct projects.

Assessment Activity: X Course Direct Other Direct X Indirect

Course Direct:

List all Courses that apply to this SLO and indicate (I) Introduce, (R) Reinforce, or (A) Assess:

CMG 1140 (I/R)	CMG 2140 (A)	CMG 4900 (A)
CMG 2110 (R)	CMG 4100 (A)	ETEC XXXX (A)

Brief Description: Measure student performance on homework assignments, projects, and exams.

Target:

- Have 70% of the students score above 70% (or 80%) on the exams.
- Have 80% of the students score above 80% on the homework and project assignments.
- Have all the students achieve 100% within one iteration of re-doing the problems (in CMG 4100).

Summary of Results:

Course results for 2015-16 are shown on the following pages. A summary evaluation follows:

In the introductory courses (CMG 1140 and 2110), the stated goals were not met. In both classes, only about 60% of the students achieved above 80% on the homework assignments. Exam results in CMG 1140 did meet the goal, but the results were low for 3 of 4 exams in CMG 2110.

In the CMG 4100 class, the students were required to redo the homework problems until they achieved a proficiency of 100%. In Fall 2015, the students achieved this proficiency about 50% of the time after one iteration and most problems 100% of the time after two iterations. For the more difficult chapters, it would typically require three iterations.

The results were much improved in the CMG 2140 and 4900 classes. Most of these students were upper classmen, and this is reflected in their work effort and timely and properly completed assignments.

The target goals were not quite achieved.

Indirect:

Brief Description:

- Evaluate student responses to Course Evaluations each semester.
- Evaluate responses on Senior Exit Surveys.
- Evaluate responses on Alumni and Employer Surveys.

Target: Minimum of 70% score on the average response rating.

Summary of Results:

The mean response to all appropriate questions on the Course Evaluation forms for all indicated classes ranged from 4.0 to 5.0 on a 5.0 scale. The goal was met.

On the Senior Exit Surveys, the average rating (for this SLO statement) for the past two years was 2.78/4.0 (or 69.5%). This is pretty close to the 70% target, but improvement is desired.

The average response to a similar question on our 2015 Alumni Survey was 4.10/5.0.

The average response to a similar question on our 2015 Employer Survey was 4.0/5.0.

The targeted goals were met.

Action Planned for Improvement:

Description: Continue to emphasize the need to spend the proper time on homework and project assignments, especially in the CMG 1140 and 2110 courses. Also, continue to emphasize the importance of proper format and submittal requirements for all assignments.

In CMG 4100, the decision was made after Fall 2015 to require the students to maintain a binder of their work to make them better organized and for easy reference as problems increased in complexity. This was done in Fall 2016 and it helped the students perform better work (and helped evaluate their work). Continue this process in the future.

When: Spring 2017.

CLO Assessment Form

Student Learning Outcome No.: 8

Course Number and Description: CMG 1140 – Basic Construction Materials

Course Learning Outcome(s) Number and Description:

CLO #2 – understand the properties and quality assurance testing of construction materials including soils, aggregates, HMA, and concrete.

CLO #3 – understand the variety of materials and products used in building construction.

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Measure student performance on Exam #1 and homework assignments #1 to #8.

When? Spring 2015 (7 students)

Target: - Have at least 70% of the students score above 70% on Exam #1.
- Have at least 80% of the students score above 80% on homework assignments #1 to #8.

Results: - 100% of the students scored above 70% on Exam #1.
- 100% of the students scored above 70% on Exam #2.
- 58% of the students scored above 80% on homework assignments #1 to #8.
The goal was met for the exam, but not the homework.

Course Indirect:

Brief Description: Evaluate the student responses to Question #24 on the course evaluation form. (I understand the properties and procedures for quality assurance testing of construction materials including soils, aggregates, HMA, and concrete.)

When? Spring 2015

Target: Have the mean response be at least 4.0/5.0.

Results: The mean response was 4.0. The goal was met.

Action Planned for Improvement:

Description: This course provides an introduction to materials testing and quality control. Need to emphasize the importance of understanding this and spending the proper time on the homework assignments.

When? Spring 2016.

CLO Assessment Form

Student Learning Outcome No.: 8

Course Number and Description: CMG 1140 – Basic Construction Materials

Course Learning Outcome(s) Number and Description:

CLO #2 – understand the properties and quality assurance testing of construction materials including soils, aggregates, HMA, and concrete.

CLO #3 – understand the variety of materials and products used in building construction.

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Measure student performance on Exam #1 and homework assignments #1 to #8.

When? Spring 2016 (12 students)

Target: - Have at least 70% of the students score above 70% on Exam #1.
- Have at least 80% of the students score above 80% on homework assignments #1 to #8.

Results: - 75% of the students scored above 70% on Exam #1.
- 58% of the students scored above 70% on Exam #2.
- 58% of the students scored above 80% on homework assignments #1 to #8.
The goal was met for the exam, but not the homework. (Same % results as last year.)

Course Indirect:

Brief Description: Evaluate the student responses to Question #25 on the course evaluation form. (I understand the properties and procedures for quality assurance testing of construction materials including soils, aggregates, HMA, and concrete.)

When? Spring 2016

Target: Have the mean response be at least 4.0/5.0.

Results: The mean response was 4.5. The goal was met.

Action Planned for Improvement:

Description: This course provides an introduction to materials testing and quality control. Once again, need to emphasize the importance of spending the proper time on the homework assignments.

When? Spring 2017.

CLO Assessment Form 2015 -2016

Student Learning Outcome No.: 08 – Analyze methods, materials and equipment used to construct projects.

Course Number and Description: CMG 2110 – Building Utility Systems

Course Learning Outcome(s) Number and Description:

Students who successfully complete this basic class should have a working knowledge of:

- CLO1: Basic thermal concepts, building heat gains (cooling) and heat losses (heating).
- CLO2: HVAC (air and hydronic) systems and solar systems.
- CLO3: Water supply and drainage (storm and sanitary) systems.
- CLO4: Electrical power distribution, lighting, fire detection, alarm and suppression.
- CLO5: Acoustics and acoustic control systems.
- CLO6: Awareness of the use of applicable codes and standards for MEPF design.

Assessment Activity: X **Course Direct** X **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations (written).

When? Fall 2015

- Target:**
- Have at least 75% of the students score above 80% on the four exams. (CLO 1-6)
 - Have at least 75% of the students score above 80% on the Homework. (CLO 1- 6)
 - Have at least 75% of the students score above 80% on the four projects. (CLO 1-6)

Results:

- CLO # 1 – 75% (exam 1), 38% HW, 100% on projects
- CLO # 2 – 63% (exam 2), 63% HW, 88% (projects 1 & 2)
- CLO # 3 – 63% (exam 3), 69% HW, 100% (project 3)
- CLO # 4 - 63% (exam 4), 44% HW, 75% (project 4)
- CLO # 5 - 100% (exam 4), 88% HW
- CLO # 6 - 63% (exams1,2,3)

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Fall 2015

Target: 3.50/5.00

Results: 4.00/5.00 (5/8)

Action Planned for Improvement:

Description: The goal was not met for all the scored items. Several students failed to submit HW's. One student was very marginal in the class and lowered exam % met. I need to spend more time on HW examples in text and class. Also, continue to encourage the students to remain current in the class.

When? Fall 2016

CLO Assessment Form 2015 - 2016

Student Learning Outcome No.: 08 – Analyze methods, materials and equipment used to construct projects.

Course Number and Description: CMG 2140 – Building Construction – Principles, Materials and Methods

Course Learning Outcome(s) Number and Description:

Students who successfully complete this basic class should have a working knowledge of:

CLO1: Thinking and communicating like a building contractor.

CLO2: Understanding of materials and systems used in building construction.

CLO3: Principles of Construction – Applicable Codes and Standards, Structural Loads, Material Properties and Sustainability, Building Construction Systems

CLO4: Materials of Construction – Wood, SIP, Steel, Concrete, Masonry, Glass, Roofing, Interior Finish items (use field trips)

CLO5: Contemporary Building Systems and Materials (Text and Field Trips).

Assessment Activity: X **Course Direct** X **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations.

When? Spring 2016

Target:

- Have at least 75% of the students score above 80% on the four exams. (CLO 1-5)
- Have at least 75% of the students score above 80% on the Homework. (CLO 1- 5)
- Have at least 75% of the students score above 80% on the projects. (CLO 1-5)

Results:

- CLO # 1 – 100% (exam 1), 100 % HW, 100% on project
- CLO # 2 – 100 % (exam 2), 100% HW, 100% on project
- CLO # 3 – 33% (exam 3), 100% HW
- CLO # 4 - 100% (exam 4),100% HW, 100% on project
- CLO # 5 - 100% (exam 4), 100% HW, 100% on project

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Spring 2016

Target: 3.50/5.00

Results: 5.00/5.00

Action Planned for Improvement:

Description: The goal was met for all the scored items except CLO 3 #. 2 students scored ~ 74% on exam 3. I need to spend more time detailing format and submittal requirements. Also, continue to encourage the students to remain current in the class.

When? Spring 2017

CLO Assessment Form

SLO No.: 8

Indicate I, R, or A: A

Course Number: CMG 4100

Course Name: Construction Equipment Management

Course Learning Outcome(s) Number and Description:

CLO 1 -Understand principles for selecting and managing construction equipment.

CLO 2 - Estimate equipment ownership and operating costs.

CLO3 - Estimate equipment production

Assessment Activity: X **Course Direct** **Indirect**

Course Direct:

Brief Description:

Students solve problems in the textbook. The student's solution of the problems are assessed.

When? Fall 2015

Target:

Students will redo problems until they reach a proficiency of 100%.

Results:

Student can reach proficiency roughly 50% of the time with one iteration depending on the chapter, and most problems 100% of the time with two iterations of the problems. Occasionally, there is a problem in some of the more difficult chapters, which take three iterations.

Course Indirect:

Brief Description:

When?

Target:

Results:

Action Planned for Improvement:

Description:

Because this course work build on itself, I think students would be better off to maintain a binder of their work. With the notebooks, they can stay organized and easily go back to refer to previous chapters.

When?

Fall 2016

The notebooks helped not only the students perform the work, but me to evaluate work.

CLO Assessment Form 2015-2016

Student Learning Outcome No.: 08 – Analyze methods, materials and equipment used to construct projects.

Course Number and Description: CMG 4900 – Construction Project Simulation

Course Learning Outcome(s) Number and Description:

CLO1: Preparing, organizing and checking bid estimates – Team.

CLO2: Preparing/Presenting bid package(s) and post award submittals – Team.

CLO3: Preparing/Presenting response to RFP for Design Build project - Team.

CLO4: Preparing/Presenting oral presentations for DB project – Team.

Assessment Activity: X **Course Direct** X **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations (written and oral).

When? Spring 2016

Target: - Have at least 90% of the students score above 80% on the four bid submittals.
- Have at least 90% of the students score above 80% on the DB submittals.
- Have at least 90% of the students score above 80% on final presentation.

Results: CLO # 1 – Written BP 1– 4: 92% to 100%.
CLO # 2 - Oral: 88% to 94%
CLO # 3 – Written DB 3: 96%
CLO # 4 - Oral: 91%

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Spring 2016

Target: 3.50/5.00

Results: 5.00/5.00

Action Planned for Improvement:

Description: The goal was met for all the scored items. I need to spend more time detailing format and submittal requirements. Also, continue to encourage the students to remain current in the class.

When? Spring 2017

SLO Assessment Form

Student Learning Outcome No.: 9

Assessment Year: 2015-16

SLO Statement: Apply construction management skills as an effective member of a multi-disciplinary team.

Assessment Activity: X Course Direct Other Direct X Indirect

Course Direct:

List all Courses that apply to this SLO and indicate (I) Introduce, (R) Reinforce, or (A) Assess:

CMG 2140 (R)	CMG 4120 (A)
CMG 2265 (R)	CMG 4900 (R)
CMG 3265 (R)	ETEC XXXX (R)

Brief Description: Measure student performance as a team member per peer evaluations by other students.

Target: - Have all the students receive favorable ratings on Peer Evaluations (minimum 80%).

Summary of Results:

Course results for 2015-16 are shown on the following pages. A summary evaluation follows:

All students received favorable ratings for the team projects in all of the indicated courses.

Historically, the typical problems have been students who do not show up regularly and do not contribute fairly. Also, there are occasional issues between Civil Engineering vs. Construction Management students in the CMG 4120 class.

The goal was met.

Indirect:

Brief Description:

- Evaluate student responses to Course Evaluations each semester.
- Evaluate responses on Senior Exit Surveys.
- Evaluate responses on Alumni and Employer Surveys.

Target: Minimum of 70% score on the average response rating.

Summary of Results:

The mean response to the question about team performance on the Course Evaluation forms for CMG 2265 and 3265 was 5.0/5.0.

The average response on the Senior Exit Surveys for this SLO was 2.82/4.0 (70.5%).

The average response to a similar question on the Alumni Survey (2015) was 4.0/5.0.

The average response to a similar question on the Employer Survey (2015) was 3.5/5.0.

The targeted goal was met.

Action Planned for Improvement:

Description: In general, the targeted goals for measuring team performance were met. Continue to emphasize the need for effective communication and the ability to participate on a multi-disciplinary team.

When: Fall 2017.

CLO Assessment Form 2015 - 2016

Student Learning Outcome No.: 09 – Apply construction management skills as an effective member of a multi disciplinary team..

Course Number and Description: CMG 2140 – Building Construction – Principles, Materials and Methods

Course Learning Outcome(s) Number and Description:

Students who successfully complete this basic class should have a working knowledge of:

CLO1: Thinking and communicating like a building contractor.

CLO2: Understanding of materials and systems used in building construction.

CLO3: Principles of Construction – Applicable Codes and Standards, Structural Loads, Material Properties and Sustainability, Building Construction Systems

CLO4: Materials of Construction – Wood, SIP, Steel, Concrete, Masonry, Glass, Roofing, Interior Finish items (use field trips)

CLO5: Contemporary Building Systems and Materials (Text and Field Trips).

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations.

When? Spring 2016

- Target:**
- Have at least 75% of the students score above 80% on the four exams. (CLO 1-5)
 - Have at least 75% of the students score above 80% on the Homework. (CLO 1- 5)
 - Have at least 75% of the students score above 80% on the projects. (CLO 1-5)

Results:

CLO # 1 – 100% (exam 1), 100 % HW, 100% on project
CLO # 2 – 100 % (exam 2), 100% HW, 100% on project
CLO # 3 – 33% (exam 3), 100% HW
CLO # 4 - 100% (exam 4),100% HW, 100% on project
CLO # 5 - 100% (exam 4), 100% HW, 100% on project

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Spring 2016

Target: 3.50/5.00

Results: 5.00/5.00

Action Planned for Improvement: Students worked as a team for class project and evaluated their own and team mates performance. Continue to use team project.

Description: The goal was met for all the scored items except CLO 3 #. 2 students scored ~ 74% on exam 3. I need to spend more time detailing format and submittal requirements. Also, continue to encourage the students to remain current in the class.

When? Spring 2017

CLO Assessment Form

Student Learning Outcome No.: 9

Course Number: CMG 2265

Course Description: Construction Quantity Survey

Course Learning Outcome(s) Number and Description:

CLO #3 – communicate effectively and interact with project team members.

Assessment Activity: **Course Direct** **Indirect**

Course Indirect:

Brief Description: Evaluate the student responses on Peer Evaluation Forms and responses to Questions on the course evaluation form.

When? Spring 2015

- Target:**
- Have all students receive favorable responses (minimum 8.0/10.0) on the Peer Evaluation forms.
 - Have the mean response be at least 3.8/5.0 on the Course Evaluation questions.

- Results:**
- 100% of the students received favorable responses on the Peer Evaluations.
 - Course Evaluations not completed this semester due to low enrollment.

Action Planned for Improvement:

Description: Continue to incorporate group homework assignments and a group project. Also, be certain to conduct a course evaluation and include optional questions to get direct feedback on specific CLOs.

When? Spring 2016.

CLO Assessment Form

Student Learning Outcome No.: 9

Course Number: CMG 2265

Course Description: Construction Quantity Survey

Course Learning Outcome(s) Number and Description:

CLO #3 – communicate effectively and interact with project team members.

Assessment Activity: **Course Direct** **Indirect**

Course Indirect:

Brief Description: Evaluate the student responses on Peer Evaluation Forms and responses to Questions on the course evaluation form.

When? Spring 2016 (7 students)

Target: - Have all students receive favorable responses (minimum 8.0/10.0) on the Peer Evaluation forms.
- Have the mean response to Question #27 be at least 3.8/5.0 on the Course Evaluation questions.

Results: - 100% of the students received favorable responses on the Peer Evaluations.
- The mean response was 5.0.
The goals were met.

Action Planned for Improvement:

Description: Continue to incorporate group homework assignments and a group project.

When? Spring 2017.

CLO Assessment Form

Student Learning Outcome Nos.: 9

Course Number and Description: CMG 3265 – Construction Cost Estimating

Course Learning Outcome(s) Number and Description:

CLO #4 – communicate and function effectively as a member of a project team.

Assessment Activity: **Course Direct** **Indirect**

Course Indirect:

Brief Description: Evaluate the student responses on Peer Evaluation Forms and responses to Questions on the course evaluation form.

When? Fall 2014

Target: - Have all students receive favorable responses (minimum 8.0/10.0) on the Peer Evaluation forms.
- Have the mean response be at least 3.8/5.0 on the Course Evaluation questions.

Results: - 100% of the students received favorable responses on the Peer Evaluations.
- Course Evaluations not completed this semester due to low enrollment.

Action Planned for Improvement:

Description: Continue to make this class group project oriented. Also, be certain to conduct a course evaluation and include optional questions to get direct feedback on specific CLOs.

When? Fall 2015.

CLO Assessment Form

Student Learning Outcome Nos.: 9

Course Number and Description: CMG 3265 – Construction Cost Estimating

Course Learning Outcome(s) Number and Description:

CLO #4 – communicate and function effectively as a member of a project team.

Assessment Activity: **Course Direct** **Indirect**

Course Indirect:

Brief Description: Evaluate the student responses on Peer Evaluation Forms and responses to Question #25 on the course evaluation form.

When? Fall 2015

- Target:**
- Have all students receive favorable responses (minimum 8.0/10.0) on the Peer Evaluation forms.
 - Have the mean response be at least 3.8/5.0 on the Course Evaluation questions.

- Results:**
- 100% of the students received favorable responses on the Peer Evaluations.
 - The mean response to Question #25 was 5.00.

The goals were met.

Action Planned for Improvement:

Description: Continue to make this class group project oriented. Also, be certain to continue the use of a course evaluation with optional questions to get direct feedback on specific CLOs.

When? Fall 2016.

CLO Assessment Form

SLO No.: 9

Indicate I, R, or A: A

Course Number: CMG 4120

Course Name: Construction Planning and Scheduling

Course Learning Outcome(s) Number and Description:

CLO 7 - Develop schedule as part of interdisciplinary project team.

Assessment Activity: X **Course Direct** **Indirect**

Course Direct:

Brief Description:

In the lab component of the course, students work as an interdisciplinary team to complete their work. Each construction management student in the class is teamed with a student from another discipline, typically a civil engineering student. They are ask to work together on group assignment and assist each other on individual assignments. Student are then ask to grade their partners at the end of the course.

When: Spring 2016

Target:

All construction management students receive an A as a partner from their respective partner.

Results:

All construction management students receive an A as a partner from their respective partner. Historically, the typical problems we have encountered have been students that do not show up, and therefore do not contribute. These can be construction management students or the other discipline. Occasionally, a civil student will find it beneath them to work well and value the contribution of their construction management student partner.

Course Indirect:

Brief Description:

When:

Target:

Results:

Action Planned for Improvement:

Description:

Our program requires a great deal of group work. I think the outcome of this assessment is a result of the amount of group work required in the program. I think this group work need to be continued in to the future.

When?

Spring 2017

CLO Assessment Form 2015-2016

Student Learning Outcome No.: 09 – apply construction management skills as an effective member of a multi disciplinary team.

Course Number and Description: CMG 4900 – Construction Project Simulation

Course Learning Outcome(s) Number and Description:

CLO1: Preparing, organizing and checking bid estimates – Team.

CLO2: Preparing/Presenting bid package(s) and post award submittals – Team.

CLO3: Preparing/Presenting response to RFP for Design Build project - Team.

CLO4: Preparing/Presenting oral presentations for DB project – Team.

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations (written and oral).

When? Spring 2016

- Target:**
- Have at least 90% of the students score above 80% on the four bid submittals.
 - Have at least 90% of the students score above 80% on the DB submittals.
 - Have at least 90% of the students score above 80% on final presentation.

Results:

- CLO # 1 – Written BP 1– 4: 92% to 100%.
- CLO # 2 - Oral: 88% to 94%
- CLO # 3 – Written DB 3: 96%
- CLO # 4 - Oral: 91%

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Spring 2016

Target: 3.50/5.00

Results: 5.00/5.00

Action Planned for Improvement: The CMG students were able to work with an international CEE graduate student. I need to be sure CEE students are prepared for estimating and scheduling tasks like the CMG students.

Description: The goal was met for all the scored items. I need to spend more time detailing format and submittal requirements. Also, continue to encourage the students to remain current in the class.

When? Spring 2017

SLO Assessment Form

Student Learning Outcome No.: 20

Assessment Year: 2015-16

SLO Statement: Understand the basic principles of mechanical, electrical, and plumbing systems.

Assessment Activity: **Course Direct** **Other Direct** **Indirect**

Course Direct:

List all Courses that apply to this SLO and indicate (I) Introduce, (R) Reinforce, or (A) Assess:

CMG 2110 (A)
CMG 4900 (A)
ETEC XXXX (A)

Brief Description: Evaluate student performance on graded homework assignments, exams, and projects.

Target:

- Have at least 75% of the students score above 80% on the exams, homework, and project in CMG 2110.
- Have at least 90% of the students score above 80% on the bid submittals and the presentation in CMG 4900.

Summary of Results:

Course results for 2015-16 are shown on the following pages. A summary evaluation follows:

The goals were not met in CMG 2110. Several students did not submit all of the homework assignments and one student in particular did poorly, which lowered the percentage scores.

The goals were met for the CMG 4900 class. Apparently, the senior-level students were more diligent in doing all of the work completely, properly, and timely.

Indirect:

Brief Description:

- Evaluate student responses to Course Evaluations each semester.
- Evaluate responses on Senior Exit Surveys.
- Evaluate responses on Alumni and Employer Surveys.

Target: Minimum of 70% score on the average response rating.

Summary of Results:

Course evaluation results not available.

The average response on the Senior Exit Surveys (last 2 years) for this SLO was 2.88/4.0 (72%).

The average response to a similar question on the Alumni Survey (2015) was 3.90/5.0 (78%).

The average response to a similar question on the Employer Survey (2015) was 3.50/5.0 (70%).

The targeted goal was met.

Action Planned for Improvement:

Description: In the CMG 2110 class, need to spend more time on homework examples and encourage the students to submit all the homework and submit it on time. Also, encourage the students to remain current in the class. In CMG 4900, spend more time on alternate designs.

When: Spring 2017

CLO Assessment Form 2015 -2016

Student Learning Outcome No.: 20 – Understand basic principles of mechanical, electrical and plumbing systems.

Course Number and Description: CMG 2110 – Building Utility Systems

Course Learning Outcome(s) Number and Description:

Students who successfully complete this basic class should have a working knowledge of:

- CLO1: Basic thermal concepts, building heat gains (cooling) and heat losses (heating).
- CLO2: HVAC (air and hydronic) systems and solar systems.
- CLO3: Water supply and drainage (storm and sanitary) systems.
- CLO4: Electrical power distribution, lighting, fire detection, alarm and suppression.
- CLO5: Acoustics and acoustic control systems.
- CLO6: Awareness of the use of applicable codes and standards for MEPP design.

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations (written).

When? Fall 2015

- Target:**
- Have at least 75% of the students score above 80% on the four exams. (CLO 1-6)
 - Have at least 75% of the students score above 80% on the Homework. (CLO 1- 6)
 - Have at least 75% of the students score above 80% on the four projects. (CLO 1-6)

Results:

- CLO # 1 – 75% (exam 1), 38% HW, 100% on projects
- CLO # 2 – 63% (exam 2), 63% HW, 88% (projects 1 & 2)
- CLO # 3 – 63% (exam 3), 69% HW, 100% (project 3)
- CLO # 4 - 63% (exam 4), 44% HW, 75% (project 4)
- CLO # 5 - 100% (exam 4), 88% HW
- CLO # 6 - 63% (exams1,2,3)

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Fall 2015

Target: 3.50/5.00

Results: 4.00/5.00 (5/8)

Action Planned for Improvement:

Description: The goal was not met for all the scored items. Several students failed to submit HW's. One student was very marginal in the class and lowered exam % met. I need to spend more time on HW examples in text and class. Also, continue to encourage the students to remain current in the class.

When? Fall 2016

CLO Assessment Form 2015 - 2016

Student Learning Outcome No.: 20 – Understanding basic principles of mechanical, electrical and plumbing systems.

Course Number and Description: CMG 4900 – Construction Project Simulation

Course Learning Outcome(s) Number and Description:

CLO1: Preparing, organizing and checking bid estimates – Team.

CLO2: Preparing/Presenting bid package(s) and post award submittals – Team.

CLO3: Preparing/Presenting response to RFP for Design Build project - Team.

CLO4: Preparing/Presenting oral presentations for DB project – Team.

Assessment Activity: **Course Direct** **Indirect**

Course Direct:

Brief Description: Measure student performance on graded presentations (oral and written).

When? Spring 2016

- Target:**
- Have at least 90% of the students score above 80% on the four bid submittals.
 - Have at least 90% of the students score above 90% on the Design Build submittals.
 - Have at least 90% of the students score above 80% on the final presentation.

Results:

CLO # 1 – Written BP 1– 4: 92% to 100%.

CLO # 2 - Oral: 88% to 94%

CLO # 3 – Written DB 3: 96%

CLO # 4 - Oral: 91%

Course Indirect:

Brief Description: Evaluate student responses on the course evaluation.

When? Spring 2016

Target: 3.50/5.00

Results: 5.00/5.00

Action Planned for Improvement:

Description: The goal was met for all the scored items. I need to spend more time on possible alternate designs. Also, continue to encourage the students to remain current in the class.

When? Spring 2017

Appendix A: Survey Results (Alumni, Employers, and Graduates):

Table A.1: Job Placement Data Result

University Career Center Data	Fall 2015 Graduates	Spring 2016 Graduates
Number of Graduates	1	2
Number of offers reported	Not reported	8
Salaries	unknown	\$50,000 to \$70,000
Placement (reported)	unknown	100%

Alumni Survey Results

The most recent Construction Management Alumni Survey was conducted in the summer of 2015. It was mailed to 54 alumni and 18 valid surveys were returned, for a response rate of 18.5%. The results to the initial general questions are summarized in Table A.2 below and the other survey results are summarized in Table A.3 below. The next survey is planned for Spring/Summer 2018.

Table A.2: Alumni Survey Results – General Questions

Survey Question	Alumni Responses				
<u>General Question:</u> What is your position within your organization?	Project Manager/ Superint. (11 each)	Scheduler or Estimator (3 each)	Design or Field Engineer (2 each)	Owner (1 each)	Sales Rep. (1 each)
<u>General Question:</u> Is this a leadership position within your organization?	Yes (78 %)		No (22%)		
<u>Survey Question #1:</u> Based on your work experience since obtaining your undergraduate degree in CMG from Michigan Tech, what is your impression of the overall quality of your educational experience in the CMG program?	Excellent (50%)	Good (40%)	Satisfactory (5%)	Fair (5%)	Marginal (0%)

Table A.3: Alumni Survey Results (2015) – Survey Questions

Listed below are several statements about the skills and knowledge you may have had to use for your employer. On a Scale of “5 = Very Satisfied” to “1 = Very Dissatisfied,” please rate your satisfaction level on how well the CMG program at Michigan Tech prepared you to apply these skills at your work place. Choose one box per row.

		Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Average Rating
#2	An understanding of construction science topics such as basic structural design, building systems, methods and materials, surveying, and computer graphics (PEO 2).	9	8	1	0	0	4.4
#3	An understanding of project management tasks such as estimating, planning, scheduling, construction law, project delivery systems, safety considerations, and other administrative tasks (PEO 3).	5	12	0	1	0	4.2
#4	Have the communication skills, oral and written, to work effectively as a member of a multi-disciplinary project team (PEO 4, SLO 1,2,9).	6	8	2	2	0	4.0
#5	An awareness of the value of continuous improvement and commitment to lifelong learning by participating in professional societies, pursuing professional certifications, and attending seminars (PEO 5).	4	6	6	2	0	3.7
#6	Ability to understand and exhibit professional, ethical, and social responsibility in your career in the construction industry (SLO 6).	6	10	2	0	0	4.2
#7	An awareness of project safety requirements and able to create a construction safety plan (SLO 3).	5	6	5	2	0	3.8
#8	Ability to perform quantity take-off and cost estimating tasks in your work (SLO 4).	9	8	1	0	0	4.4
#9	Ability to perform project planning, scheduling, and control tasks in your work (SLO 5,7,16).	5	8	2	2	1	3.8
#10	An understanding of the design and construction process, methods of project delivery, construction documents, and contract administration (SLO 12,17).	7	3	6	2	0	3.8
#11	Ability to analyze methods, materials and equipment used to construct projects (SLO 8).	7	6	4	1	0	4.1
#12	Ability to apply basic surveying techniques for construction layout and control (SLO 9).	7	8	3	0	0	4.2
#13	Ability to use computer applications and graphics to perform project management tasks in your work (SLO 10).	4	9	1	4	0	3.7
#14	Understand construction accounting, cost control, and risk management (SLO 13,14).	5	5	5	2	1	3.6
#15	Understand materials standards, quality assurance and control on construction projects (SLO 15).	5	8	3	1	1	3.8

#16	An understanding of basic structural design theory for steel, timber, concrete, and masonry as needed in your work (SLO 19).	8	9	1	0	0	4.4
#17	An understanding of the basic principles of mechanical, electrical, and plumbing systems in a building (SLO 20).	4	9	5	0	0	3.9
#18	An understanding of the basic principles of sustainable construction (SLO 18).	5	10	3	0	0	4.1
#19	An ability to assume positions of leadership within your respective organization.	5	7	5	1	0	3.9
	Overall Average Rating						4.0

Table A. 4: Alumni Survey Results (2015) – Additional Questions

Please indicate a “Yes” or “No” response to the following statements:			
	Yes	No	No Response
I participate in one (or more) professional societies.	7	11	0
I have taken the AIC exam for certification as an Associate Constructor (AC).	1	17	0
I have successfully passed the AIC Certification exam.	1	17	0
I have pursued other professional certification(s).	8	10	0
I have attended professional seminars as a commitment to lifelong learning.	11	7	0

Alumni Survey Results – Summary of Additional Comments

1. I feel that I was well-prepared for the job force upon graduation from Michigan Tech.
2. I was part of the second graduating class from the CM program at Michigan Tech. The certifications in concrete and aggregates were extremely important for my first position. I believe that internships should be required as part of the curriculum. Construction is a field where you need hands on experience working with a project team.
3. The CM program should offer some courses for infrastructure and industrial construction, not just commercial buildings. Specifically, roadway construction and a mandatory course on quality management. Explain the different career paths available with the CM degree.
4. Have an advanced course using estimating software such as Sage Timberline.
5. Consider PMP certifications and discuss LEED.
6. Use Microsoft Project rather than Primavera P6.
7. Less PowerPoint presentations and more work simulations or hands-on activities.
8. A major weak point of current CM grads is the lack of understanding when it comes to reviewing contractor submittals. Major issues included superintendents processing incomplete or wrong submittals. Graduates should be taught to do quality control in their senior year.

Employer Survey Results

The most recent Construction Management Employer Survey was conducted in the summer of 2015. It was mailed to 138 employers of CMG graduates, 8 were bounced back (and not included in the total count), and 4 responses were returned. This is a very low response rate of 3.1 %. The high number of employers includes several surveys sent to a different person at the same company (such as 9 surveys sent to Bechtel, Inc.). We are uncertain about the reasons for such a low response, but plan to investigate and try for significant improvement on the return rate next time. In any case, the results to the Employer Survey are summarized in Tables A.5 and A.6 below:

Table A.5: Employer Survey Results (2015) – General Questions

Survey Question	Employer Response				
<u>General Question:</u> What is the name of your company?	Bechtel OG & C, Bechtel Corp., Michels Corp., Mears Group				
<u>General Question:</u> What is your position/title in your company?	Senior Project Manager (1), Title not given (3)				
<u>General Question:</u> Total number of CMG graduates that you currently supervise or have supervised.	Responses all listed 1.				
<u>General Question:</u> Based upon your professional experience and opportunities to observe CMG graduates from Michigan Technological University and other institutions, what is your impression about the overall quality of the CMG Michigan Tech graduates?	Excellent (1 each)	Good (3 each)	Satisfactory (0)	Fair (0)	Marginal (0)

Table A.6: Employer Survey Results (2015) – Survey Questions

Listed below are several statements about the skills and knowledge expected of our CMG graduates. On a Scale of “5 = Very Satisfied” to “1 = Very Dissatisfied,” please rate your satisfaction level with regard to the performance of our CMG graduates that you have supervised. Please choose one box per row.							
		Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Average Rating
#2	An understanding of construction science topics such as basic structural design, building systems, methods and materials, surveying, and computer graphics (PEO 2).	1	3	0	0	0	4.25
#3	An understanding of project management tasks such as estimating, planning, scheduling, construction law, project delivery systems, safety considerations, and other administrative tasks (PEO 3).	2	2	0	0	0	4.5
#4	Have the communication skills, oral and written, to work effectively as a member of a multi-disciplinary project team (PEO 4, SLO 1,2,9).	2	1	1	0	0	4.25
#5	An awareness of the value of continuous improvement and commitment to lifelong learning by participating in professional societies, pursuing professional certifications, and attending seminars (PEO 5).	1	1	2	0	0	3.75
#6	Ability to understand and exhibit professional, ethical, and social responsibility in your career in the construction industry (SLO 6).	3	1	0	0	0	4.75
#7	An awareness of project safety requirements and able to create a construction safety plan (SLO 3).	2	2	0	0	0	4.5
#8	Ability to perform quantity take-off and cost estimating tasks in your work (SLO 4).	1	2	1	0	0	4.0
#9	Ability to perform project planning, scheduling, and control tasks in your work (SLO 5,7,16).	2	2	0	0	0	4.5
#10	An understanding of the design and construction process, methods of project delivery, construction documents, and contract administration (SLO 12,17).	2	1	1	0	0	4.25
#11	Ability to analyze methods, materials and equipment used to construct projects (SLO 8).	1	2	1	0	0	4.0
#12	Ability to apply basic surveying techniques for construction layout and control (SLO 9).	0	3	1	0	0	3.75
#13	Ability to use computer applications and graphics to perform project management tasks in your work (SLO 10).	2	2	0	0	0	4.5
#14	Understand construction accounting, cost control, and risk management (SLO 13,14).	1	2	1	0	0	4.0
#15	Understand materials standards, quality assurance and control on construction projects (SLO 15).	1	3	0	0	0	4.25

#16	An understanding of basic structural design theory for steel, timber, concrete, and masonry as needed in your work (SLO 19).	0	2	2	0	0	3.5
#17	An understanding of the basic principles of mechanical, electrical, and plumbing systems in a building (SLO 20).	0	2	2	0	0	3.5
#18	An understanding of the basic principles of sustainable construction (SLO 18).	1	2	1	0	0	4.0
#19	An ability to assume positions of leadership within your respective organization.	1	2	1	0	0	4.0
	Overall Average Rating						4.13

Table A.7: List of Recent IAB Discussions and Recommendations (2013-16 Meetings)

Classification	Discussion Items and Recommendation	Owner	Status
CMG Curriculum Issues	Continue to incorporate Revit and BIM in CMG 1000, and use in other classes.	CMG faculty	This has been done.
	Continue to include “certifications” in CMG 1140, especially the ACI Concrete Testing certification.	CMG faculty	This has been done.
	Software applications are important in Estimating (CMG 3265) and Scheduling (CMG 4120), but fundamentals are important.	CMG faculty	Continue to use Excel. Incorporate new Estimating software in fall 2011.
	Safety considerations are important, incorporate MIOSHA Certification in CMG 4400.	CMG faculty	Continue to offer the 10-hour MIOSHA Cert. in CMG 4400.
	Incorporate jobsite visits and guest speakers as part of the course work.	CMG faculty	This is ongoing.
CMG Program Issues	Major focus of our recent meetings (October 2013 through April 2016) were brainstorming sessions regarding marketing and recruiting for the CMG program. The IAB again recommended that the CMG faculty and the IAB members take an active role to promote the program and recruit students. The IAB also recommended that we continue to develop more relationships and articulation agreements with community colleges, especially regional colleges in Michigan and Northern Wisconsin.	School of Technology administration, CMG faculty, IAB members.	This is ongoing. Faculty and IAB member(s) plan to attend Construction Career Day events as much as possible. New and improved website was completed in 2013-14.
	Discussed the possibility of initiating a dedicated CMG scholarship for incoming students.	IAB members.	This effort is underway.
	Discussed the hiring of an Outreach person specifically for recruiting CMG students (2016).	School of Tech. admin. & IAB	This is being investigated.
Student Activities	Encourage internships, co-ops, and/or summer jobs in the construction field.	CMG faculty	This is ongoing.
	Encourage students to become involved in the Michigan Tech Student Chapter of the Associated General Contractors (AGC).	CMG faculty	This is ongoing. Husky Construction is a joint student organization for CMG and CEE.

Board Business	The Board added two new members in 2013 – Ron Doolittle (GE Johnson) and Brady Frederick (Edgerton Contractors).	CMG faculty and School of Tech. Administration.	Search is completed.
	Continue to meet twice annually (fall and spring). If possible, incorporate the AGC-SCAN event or Career Day at the fall Meeting and Senior Project presentations at the spring meeting.	CMG faculty and IAB members	This was implemented in fall 2011.
	Discussion to add Board members, including representation from trade contractors and organizations and CMG alumni (2015, 2016)	CMG faculty, administration, and IAB members.	This has not been done yet.
	Brady Frederick dropped off the Board due to a new job focused on civil engineering.		This has been done.

Table A.8: Graduate Exit Interview Results – Survey Questions (2014-15 and 2015-16)

Please rate the quality of education and training you received from the Construction Management program in the following aspects: Outstanding = 4; Good, no weaknesses = 3; Fair, minor weaknesses = 2; Poor, major weaknesses = 1; Completely unprepared = 0.					
SLO	Survey Question:	2014-15			2015-16
		Fall 2014	Spring 2015	Avg. for Yr.	Spring 2016
#1	Create written communications appropriate to the construction discipline.	3.0	2.7	2.85	2.5
#2	Create oral presentations appropriate to the construction discipline.	3.0	2.5	2.75	3.0
#3	Create a construction safety plan.	1.5	2.5	2.00	2.0
#4	Create construction project cost estimates.	4.0	3.2	3.60	4.0
#5	Create construction project schedules.	3.5	1.7	2.60	1.5
#6	Analyze professional decisions based on ethical principles.	2.5	3.2	2.85	3.5
#7	Analyze construction documents for planning and management of construction processes.	3.0	2.8	2.90	2.5
#8	Analyze methods, materials, and equipment used to construct projects.	3.0	2.8	2.90	3.0
#9	Apply construction management skills as an effective member of a multi-disciplinary team.	3.0	2.7	2.85	3.0
#10	Apply electronic-based technology to manage the construction process.	3.5	2.0	2.75	2.0
#11	Apply basic surveying techniques for construction layout and control.	3.5	2.3	2.90	2.5
#12	Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.	3.0	2.3	2.65	2.5
#13	Understand construction risk management.	3.0	2.3	2.65	2.5
#14	Understand construction accounting and cost control.	2.0	2.2	2.10	2.0
#15	Understand construction quality assurance and control.	3.5	2.5	3.00	2.0
#16	Understand construction project control processes.	3.0	2.5	2.75	2.0
#17	Understand the legal implications of contract, common, and regulatory law to manage a construction project.	3.5	2.2	2.85	3.0
#18	Understand the basic principles of sustainable construction.	3.5	2.3	2.90	2.5
#19	Understand the basic principles of structural behavior.	4.0	3.2	3.60	4.0
#20	Understand the basic principles of mechanical, electrical, and plumbing systems.	3.0	2.8	2.90	3.0
#21	Overall, I think the program is:	3.5	2.3	2.90	2.5
	Average Rating for Q # 1 to 20	3.12	2.52	2.67	2.64
	Number of Respondents	2	6	8	2
	Number of Graduates	2	7	9	2

- Note: There was only 1 graduate in fall 2015 and he did not respond to the survey.

Table A.9: Graduate Exit Interview Results – General Questions (2014-15 and 15-16 Academic Years)

Please respond to the following General Questions:		Fall 2014 (2 respondents/2 graduates)	Spring 2015 (6 respondents/ 7 graduates)	Fall 2015 (1 grad, 0 res) Spring 2016 (2 respond./2 graduates)
#2	When did you begin your job searching?	Spring 2014	Fall 2014	Fall 2015
#3	How many job applications have you submitted so far?	5 to 40	Varies from 2 to 20	1 @ 1, 1 @ 10
#4	How many offers have you received so far?	1 @ 4 offers 1 @ 2 offers	1 @ 3 offers 2 @ 0 offers 1 @ 2 offer 2 @ 1 offer	1 @ 1 1 @ 5
#5	Have you already accepted a job offer?	Yes (1 each) Pending (1 each)	Yes (3 each) Pending (1 each) No (2 each)	Yes (2 each)
#6	Please provide your starting salary (optional).	1 @ \$50,000 to 60,000 1 @ \$40,000 to 50,000	3 @ \$50,000 to 60,000 1 @ \$60,000 to 70,000	1 @ \$50,000 to 60,000 1 @ \$60,000 to 70,000
#7	What knowledge/skills/abilities learned in this program have helped you the most in obtaining a job?	Estimating, scheduling, and CAD. Project-related classes that required estimating and scheduling.	Project courses, cost estimating, scheduling, equipment management, and design work.	Reading plans, contracts, estimating, building components & utilities, CAD & Revit.
#8	What knowledge/skills/abilities do you think can help you find a more satisfying job but have not been adequately developed in this program?	More real life problems and more information about job positions for careers.	More soil mechanics and concrete design work. Restructuring of the scheduling class to make the software less confusing. More 3D software.	More using Excel and other software such as Bluebeam.
#9	As a college student, did you ever take a co-op or intern position related to you major or work in a position related to your major (full or part-time)?	Yes (2 each)	Yes (5 each) No (1 each)	Yes (2 each)
#10	If you answered Yes to Question #9, for which firm(s) have you worked and for how many months?	MDOT, Spicer Group, City of Houghton	MDOT (2), Verso Paper, Grede Foundries, Pahlow Masonry	Edgerton Contractors, Fisher Contracting, Braun Intertec, Tetra Tech
#11	Other than the Senior Project course, did you participate in any “Enterprise” or similar programs while in college?	Yes (1 each) No (1 each)	Yes (4 each) No (2 each)	No (2 each)
#12	If you answered to Question #11, please list which Enterprise or other program(s).	ETEC Enterprise, Baraga Hospital Home Hospice	ETEC, ASC Competition	
#13	While you were a student at MTU, were you a member of any student or professional organization? Note the organization and your level of participation in each.	Yes (2 each) Husky Construction MTU Sledheads MTU Fishing Club	Yes (2 each) Skip (4 each) ASCE MTU football	Husky Design and Construction

#14	Do you plan to go to graduate school?	Yes (1 each), No (1 each)	No (6 each)	Yes (1 each) No (1 each)
#15	Do you expect to take continuing education courses, seminars, etc. throughout your career?	Yes (2 each)	Yes (5 each) No (1 each)	Yes (2 each)
#16	What recommendations would you make to the faculty for ways to improve students' experiences in this program?	Continue to include field trips and real-world estimating projects. Incorporate lab courses where we work with equipment. More opportunity to talk with industry professionals.	Incorporate more use of new technology software. Recruit more students. Continue field trips to project sites as much as possible.	Have the capstone project focus more on project simulation rather than design. More classes dealing with the money side of the projects. A class that focuses on 3D modeling of buildings. More in-depth study of building materials and building utilities (eliminate HASS class).

Appendix B: University Learning Goals

Construction Management LEARNING GOALS	ASSESSMENT ACTIVITY	WHEN?	RESULTS 1	ACTION PLANNED FOR IMPROVEMENT. WHEN?	RESULTS 2	ACTION PLANNED FOR IMPROVEMENT. WHEN?
<p>3. An awareness of the basic civil, structural, mechanical, and electrical systems that are incorporated in a building project. (PO #2) (New SLO # 20)</p>	<p>Type: <u>_x_ Course Direct</u> <u>__ Other Direct</u> <u>_x_ Indirect</u> Brief description: Course Direct: Measure student performance on exams, graded homework, and projects. Indirect: Evaluate student responses to Evaluation questions and Senior Exit Survey. Target: Course Direct: CMG 2110 and CMG 2140: Have 70% of the students score above 70% on the exams; have 70% of the students score above 70% on the homework assignments and the projects. Indirect: <u>Evaluations</u> – student rating above 3.50 for Q # 1-20. <u>Senior Exit Survey</u> – weighted average of relevant responses at least 2.80/4.00. University Goal: DISC</p>	<p>Fall 2013 and Spring 2014</p>	<p>Date: December 2013</p> <p>Course Direct: <u>CMG 2110</u> (Fall 2013) 4 Exams - 81% > 70% HW - 100% > 70% 3 Projects - 100% > 70%</p> <p>Indirect: Q # 1-20 – Avg. = 4.43</p> <p>Date: April 2014</p> <p>Course Direct: <u>CMG 2140</u> (Spring 2014) 4 Exams - 84% > 70% HW - 100% > 70% Projects - 100% > 70%</p> <p>Indirect: Q # 1-20 – Avg. = 3.18</p> <p>Senior Exit Survey: Weighted Avg. = 2.90</p>	<p>The goals were met except for the student evaluations in CMG 2140. Had some difficulties with Exam #3 material. Plan to spend more time on homework and labs working on skills with a reduction on class material.</p> <p>To be implemented in 2014-15.</p>	<p>Date: December 2014</p> <p>Course Direct: <u>CMG 2110</u> (Fall 2014) 4 Exams - 100% > 78 HW - 100% > 80 4 projects - 100% > 79 Final Grade 100% > 85</p> <p>Indirect: Avg. = 5.00</p> <p>Date: April 2015</p> <p>Course Direct: <u>CMG 2140</u> (Spring 2015) Exam 1,4 - 100% > 80 Exam 2 - 75% > 70 Exam 3 - 50% > 70 HW - 100% > 92 Project - 100% > 95 Final Grade - 100% > 80</p> <p>Indirect: Avg. = 4.25</p>	<p>The goals were met. Issues with Exam #3 in CMG 2140 and this material will be addressed in spring 2016.</p>

Construction Management LEARNING GOALS	ASSESSMENT ACTIVITY	WHEN?	RESULTS 1	ACTION PLANNED FOR IMPROVEMENT. WHEN?	RESULTS 2	ACTION PLANNED FOR IMPROVEMENT. WHEN?
<p>4. An ability to communicate effectively, both orally and written. (PO #11)</p>	<p>Type: <u>_x_ Course Direct</u> <u>__ Other Direct</u> <u>_x_ Indirect</u></p> <p>Brief description: Course Direct: <u>CMG 1000 & CMG 4210:</u> Students complete a written assignment that is used to assess disciplinary knowledge and by using University standard rubric measure written communication skills.</p> <p><u>CMG 4900:</u> Measure student performance on oral and written submittals.</p> <p><u>ENT XXXX:</u> Students complete an oral presentation that is used to assess disciplinary knowledge and by using University standard rubric measure written communication skills.</p>	<p>Fall 2013 and Spring 2014</p> <p>Communication skills are evaluated in about 40% of the CMG major courses. For this assessment, we have included the results for <u>4 courses:</u> CMG 1000 CMG 4210 CMG 4900 ENT XXXX</p>	<p>Date: December 2013</p> <p>Course Direct: <u>CMG 1000</u> (Fall 2013)</p> <p>5A.1 Context of and Purpose for Writing 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.2 Organization and Conventions 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.3 Content Development 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.4 Sources and Evidence 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.5 Control of Syntax and Mechanics 75% of the students achieve CORE 2000 standards or greater.</p>	<p><u>CMG 1000 & 4210 and ENT XXXX:</u> The goals were met. However, there is room for improvement. The instructor will share with the students the rubric that their work is being measured by, explain the expectations to them, and strategies for improvement.</p>	<p>Date: December 2014</p> <p>Course Direct: <u>CMG 1000</u> (Fall 2014)</p> <p>5A.1 Context of and Purpose for Writing 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.2 Organization and Conventions 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.3 Content Development 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.4 Sources and Evidence 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.5 Control of Syntax and Mechanics 60% of the students achieve CORE 2000 standards or greater. The two students not achieving CORE 2000 were international students, one from Canada and one from Korea.</p>	<p><u>CMG 1000, 4210, and ENT XXXX:</u></p> <p>The goals were met.</p>

	<p>Target: Course Direct: <u>CMG 1000 & CMG 4210</u> A minimum of 70% of the students achieve CORE 2000 standards or greater.</p> <p><u>CMG 4900:</u> Students to score 80% or higher on both oral and written submittals.</p> <p><u>ENT XXXX:</u> A minimum of 7-5 of the students achieve CORE 2000 standards</p> <p>Indirect: <u>CMG 4900:</u> Student Instructor rating above 3.50 for Q # 1-20</p>		<p><u>CMG 4210</u> (Fall 2013)</p> <p>5A.1 Context of and Purpose for Writing 71% of the students achieve CORE 2000 standards or greater.</p> <p>5A.2 Organization and Conventions 71% of the students achieve CORE 2000 standards or greater.</p> <p>5A.3 Content Development 71% of the students achieve CORE 2000 standards or greater.</p> <p>5A.4 Sources and Evidence 86% of the students achieve CORE 2000 standards or greater.</p> <p>5A.5 Control of Syntax and Mechanics 86% of the students achieve CORE 2000 standards or greater.</p> <p>Date: April 2014</p> <p>Course Direct: <u>CMG 4900:</u> Oral (6): 79%,97%,98%,99%,95%,90%</p> <p>Written (6): 895,96%,98%,96%,86%,94%</p>	<p><u>CMG 4900:</u> The goals were met, save the first oral was slightly below the 80% target.</p> <p>Continue to use several</p>	<p><u>CMG 4210</u> (Fall 2014)</p> <p>5A.1 Context of and Purpose for Writing 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.2 Organization and Conventions 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.3 Content Development 100% of the students achieve CORE 2000 standards or greater.</p> <p>5A.4 Sources and Evidence 80% of the students achieve CORE 2000 standards or greater.</p> <p>5A.5 Control of Syntax and Mechanics 100% of the students achieve CORE 2000 standards or greater.</p> <p>Date: April 2014</p> <p>Course Direct: <u>CMG 4900:</u> Oral (6): 88,92,93,98,96,86</p> <p>Written (6): 71,86,86,94,80,91</p>	<p><u>CMG 4900:</u> The goals were met. Continue to use several oral/written presentations throughout this Capstone class.</p>
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	<p>University Goal: COMM</p>		<p><u>ENT XXXX:</u></p> <p>5B.1 Organizational Pattern Average score 3.2 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.2 Language Choices Average Score 3.5 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.3 Delivery and Composure Average Score 3.4 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.4 Support Average Score 3.2 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.5 Visual Aids Average Score 3.2 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.6 Central Message and Content Development Average Score 3.4 - 100% of the students achieve CORE 2000 standards or greater.</p> <p><u>Indirect:</u> <u>CMG 4900:</u> Avg. Rating = 3.94</p>	<p>oral/written presentation throughout this Capstone class.</p> <p>See attached grading rubrics used.</p>	<p><u>ENT XXXX: (Spring 2015)</u></p> <p>5B.1 Organizational Pattern Average score 3.5 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.2 Language Choices Average Score 3.5 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.3 Delivery and Composure Average Score 3.7 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.4 Support Average Score 3.5 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.5 Visual Aids Average Score 3.6 - 100% of the students achieve CORE 2000 standards or greater.</p> <p>5B.6 Central Message and Content Development Average Score 3.0 - 100% of the students achieve CORE 2000 standards or greater.</p> <p><u>Indirect:</u> <u>CMG 4900:</u> Avg. Rating = 4.50</p>	
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Construction Management LEARNING GOALS	ASSESSMENT ACTIVITY	WHEN?	RESULTS 1	ACTION PLANNED FOR IMPROVEMENT. WHEN?	RESULTS 2	ACTION PLANNED FOR IMPROVEMENT. WHEN?
5. Apply basic surveying technique for construction layout and control (SLO #11)	<p>Type: <input checked="" type="checkbox"/> Course Direct <input type="checkbox"/> Other Direct <input checked="" type="checkbox"/> Indirect</p> <p>Brief description: Course Direct: Measure student performance on graded <i>Exams, Quizzes, Homework</i> and <i>Labs</i> that involve surveying-related material.</p> <p>Indirect: Assess student responses on <i>Course Evaluations</i> and <i>Senior Exit Survey</i></p> <p>Target: Course Direct: SU 2000 and CMG 3200/ SU 3210: Have at least 70% of the students score \geq 70% on <i>exams</i> and <i>quizzes</i>. Have at least 70% of the students score \geq 80% on <i>homework</i> and <i>labs</i>.</p>	Fall 2014 and Spring 2015	<p>Date: December 2014</p> <p>Course Direct: SU 2000 (Fall 2014): Final Exam: Avg. = 84%, with 87% of students scoring \geq 70% Mid-term: Avg. = 76%, with 75% of the students scoring \geq 70%</p> <p>Quizzes (11 total): Avg. ranged from 75% (Quiz #5) to 95% (Quizzes #8 & #11). For each quiz, > 70% of students achieved a score \geq 70%, with the <i>exception</i> of Quiz #5 which had 68%.</p> <p>Labs: CAD-based (8 total): Avg. was 90%. For each one, > 70% of students achieved a score > 80%. Equipment-based (4 total): Avg. was 97%. For each one > 70% of students achieved > 80%.</p> <p>Indirect: SU2000 Lab – Course Eval.: Avg. for 23 Questions 4.32 out of 5</p>	<p>Target (i.e., goal) was met in <u>most</u> cases; however, missed on one SU 2000 quiz and two CMG 3200/ SU 3210 Homework's. Spend some additional time on the topics that these dealt with. Also, encourage students to ask for help.</p> <p>Implement during the 2015-16 school year.</p> <p>For CMG 3200/SU 3210 need to perform a more <i>detailed grade breakdown</i> (ex. typ. only a portion of an exam dealt with "surveying").</p> <p>Implement Spring 2016.</p> <p>Incorporate another HW and/or Lab focusing on <i>Site Layout</i>.</p> <p>Implement Spring 2016.</p>	<p>Fall 2015 and Spring 2016.</p> <p>Course Direct: SU 2000: More than 70% of the students scored above 70% on all graded tests, quizzes, and lab exercises.</p> <p>Course Indirect: Weighted average for questions on the Course Evaluations was above 4.0.</p>	The targets were met. Continue to monitor the course each semester.

	<p>Indirect: Student rating \geq 4.00 out of 5 on <i>Course Evaluations</i>.</p> <p>Student rating \geq 3.00 out of 4 on <i>Senior Exit Survey</i>.</p> <p>University Goal: DISC</p>		<p>Date: April 2015</p> <p>Course Direct: SU 2000 (Spring 2015): Final Exam: Avg. = 84%, with 90% of students scoring \geq 70%</p> <p>Mid-term: Avg. = 76%, with 71% of the students scoring \geq 70%</p> <p>Quizzes (11 total): Avg. ranged from 75% (Quiz #7) to 95% (Quizzes #8 & #11). For each quiz, > 70% of students achieved a score \geq 70%</p> <p><u>Labs:</u> CAD-based (8 total): Avg. was 87%. For each one, > 70% of students achieved a score > 80%.</p> <p>Equipment-based (4 total): Avg. was 90%. For each one, > 70% of students achieved > 80%.</p> <p>Senior Exit Survey: Weighted Avg. = 2.90</p>	<p>Strive to increase <i>Senior Exit Survey</i> response to “<i>Perform survey and site survey tasks</i>” to \geq 3.00 (i.e., Good, no weaknesses) out of 4.</p>		
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Construction Management LEARNING GOALS	ASSESSMENT ACTIVITY	WHEN?	RESULTS 1	ACTION PLANNED FOR IMPROVEMENT. WHEN?	RESULTS 2	ACTION PLANNED FOR IMPROVEMENT. WHEN?
<p>6. Create written communications appropriate to the construction discipline (SLO #1)</p> <p>University Learning Goal 6 – Information Literacy Students will be able to analyze the need for, strategically access, critically evaluate, and use information effectively, ethically, and legally.</p>	<p>Type: <input checked="" type="checkbox"/> Course Direct <input type="checkbox"/> Other Direct <input type="checkbox"/> Indirect</p> <p>Brief description: Course Direct: <u>CMG 4210</u> Students complete a written assignment that is used to assess disciplinary knowledge and by using University standard rubric measuring informational literacy skills.</p> <p>University Goal: INFO</p>	<p>Fall 2014</p>	<p>Date: December 2014</p> <p>6.1 Determine the Extent of Information Needed - 80% of the students achieve CORE 2000 standards or greater.</p> <p>6.2 Access the Needed Information - 60% of the students achieve CORE 2000 standards or greater.</p> <p>6.3 Evaluate Information Sources Critically - 60% of the students achieve CORE 2000 standards or greater.</p> <p>6.4 Synthesize Information to Accomplish a Specific Purpose - 60% of the students achieve CORE 2000 standards or greater.</p> <p>6.5 Use Information Ethically - 60% of the students achieve CORE 2000 standards or greater.</p> <p>6.6 Access and Use Information Legally - 60% of the students achieve CORE 2000 standards or greater.</p>	<p>The results were poor and there was much room for improvement. Most of the students had no idea how to go about this and stated that they had no previous experience in producing a research paper of this nature.</p> <p>I consulted a colleague who teaches this topic at another institution and he recommended that I refer the students to Purdue's Online Writing Laboratory AKA OWL. I will do this next year in an effort to develop the student's skill in this area.</p> <p>Additionally, I will have the students submit a rough draft several weeks prior to the due date to allow me to guide those who may be off track.</p>	<p><u>CMG 4210</u> (Fall 2015)</p> <p>6.1 Determine the Extent of Information Needed - 100% of the students achieve CORE 2000 standards or greater.</p> <p>6.2 Access the Needed Information - 100% of the students achieve CORE 2000 standards or greater.</p> <p>6.3 Evaluate Information Sources Critically 100% of the students achieve CORE 2000 standards or greater.</p> <p>6.4 Synthesize Information to Accomplish a Specific Purpose - 100% of the students achieve CORE 2000 standards or greater.</p> <p>6.5 Use Information Ethically - 100% of the students achieve CORE 2000 standards or greater.</p> <p>6.6 Access and Use Information Legally - 100% of the students achieve CORE 2000 standards or greater.</p>	<p>This was a small class of only two exceptional students. So, this will need to be continued to be monitored.</p> <p>Note from 2016 –</p> <p>Students continue to do well on all points of this assignment. Purdue's Online Writing Laboratory as a tool, has proven to make a significant improvement on the SLO.</p>

Appendix C: University Student Learning Goals (USLG) - Description

USLG 1 – Disciplinary Knowledge

Students demonstrate a depth of knowledge in one area/discipline, as well as a breadth of knowledge that (1) enables adaptability and flexibility as knowledge grows and changes, and (2) recognizes linkages/complementarity to other areas/disciplines.

USLG 2 – Knowledge of the Physical and Natural World

Students demonstrate knowledge of the physical and natural world. This is accomplished by studying science and mathematics.

USLG 3 – Global Literacy

A globally literate student will demonstrate the ability to understand and analyze issues on multiple scales and from diverse perspectives, acknowledging interconnectivity and complexity. As globally literate, students should (1) become informed and open-minded people who are attentive to diversity across the spectrum of differences, (2) seek to understand how their actions affect the human and natural world on multiple scales, and (3) address the world's most pressing and enduring issues while considering context, complexity, and interconnectivity.

USLG 4 – Critical and Creative Thinking

Students will be able to think critically and creatively, as demonstrated by their broad, adaptable and versatile use of reasoning, logic, and evidence, to access and evaluate information and solve complex problems both independently and in groups.

USLG 5 – Communication

Students will be able to communicate effectively, orally, in writing and in new media, to a wide variety of audiences.

USLG 6 – Information Literacy

Students will be able to analyze the need for, strategically access, critically evaluate, and use information effectively, ethically, and legally.

USLG 7 – Technology

Students will demonstrate knowledge of technology and its implications in society, and be able to design and/or use technology for creative activities or innovative solutions to problems.

USLG 8 – Social Responsibility and Ethical Reasoning

Students will be able to identify and address conflicting ethical values and develop a sense of responsibility for the broad impacts of individual actions and social institutions. They will understand their role as citizens and their responsibility to work with others in promoting quality of life and a sustainable society.

Appendix D: List of Continuous Improvement Actions for CMG Courses

Table D.1: Recently completed and Planned Actions for Course Improvement

Course	Course Improvement Actions (Status)
CMG 1000	<ul style="list-style-type: none"> Update the CAD software utilized for the lab portion of the course (from 2012 to 2014 version of AutoCAD and Revit). Change/update textbook used for the lab.
CMG 1140	<ul style="list-style-type: none"> Incorporate ACI Concrete Testing Certification in the class and lab (was implemented in spring 2012).
CMG 2110	<ul style="list-style-type: none"> Incorporate construction plan reading fall 2011. Include two field trips to see mechanical and electrical equipment. Spend more time on homework examples in class and continue to strongly encourage the students to remain current in the class (Fall 2016).
CMG 2120	<ul style="list-style-type: none"> Change to a better textbook, more focused on Statics and Strength of Materials with more variety and more example problems (was implemented in spring 2012).
CMG 2140	<ul style="list-style-type: none"> Incorporate construction plan reading spring 2012. Include field trips to different types of building construction. Incorporate a “submittal project” in the class (implemented in Spring 2014). Spend additional class time detailing format and submittal requirements (implemented in Spring 2017).
CMG 2265	<ul style="list-style-type: none"> Less focus on print reading (done in CMG 1000) and more time spent on Quantity Take-off, including a Team Project (was implemented in spring 2010).
CMG 3200	<ul style="list-style-type: none"> Update the CAD software utilized for the lab portion of the course to <i>Carlson Civil Suite 2014</i>. Look into addressing a few additional topics and eliminating and/or scaling back on others that are currently on the course outline.
CMG 3250	<ul style="list-style-type: none"> Need to spend more time on review of Statics and Strength of Materials (done in CMG 2120) (was implemented in fall 2011). Need to reference and use the Code books (AISC, ACI, AFPA) in class (was implemented in fall 2011). Incorporate use of AISC Power Points for structural steel (implement Fall 2016).
CMG 3265	<ul style="list-style-type: none"> Less time spent on Quantity Take-off review (increased in CMG 2265) and more focus on Team Projects – incorporate two projects as part of the class (was implemented in 2010). Continue emphasis on projects and encourage the use of On Center software for quantity take-off and pricing (implemented in Fall 2013).
CMG 4000	
CMG 4100	<ul style="list-style-type: none"> Incorporate individual presentations on a piece of construction equipment as part of the course grade (implemented in fall 2008). Require the students to maintain a binder of their work to make them better organized and easier to refer to previous chapters (implemented in Fall 2016).
CMG 4120	<ul style="list-style-type: none"> This class is being team taught with Civil Engineering. Groups are integrated for project related work. Separate CLO/SLO components in specific assignments for better evaluation. Continue to ensure that the software is functioning properly early in the semester.

CMG 4200	<ul style="list-style-type: none"> • This now a required CMG course, rather than a Technical Elective. This will ensure coverage of Construction Law in the curriculum (implemented in fall 2010).
CMG 4210	<ul style="list-style-type: none"> • Develop more project based labs for group assignments. • Require the students to produce a project specific safety plan. Spend some class time discussing example safety plans for comparison (implemented in Fall 2015).
CMG 4300	<ul style="list-style-type: none"> • Put lectures online and use classroom time for problems and discussion.
CMG 4400	<ul style="list-style-type: none"> • Drop the course textbook (PowerPoint slides cover the material). • Incorporate a <i>baseline measurement</i> (i.e., set of questions and compare results at beginning vs. end of the semester). • Continue to acquire instructional aids (safety equipment, safety videos, etc.). • Although opportunities limited due to class size and location of Michigan Tech, promote/provide students additional opportunities to obtain safety training beyond this course (MIOSHA training, UPBA courses...). • Have the students review a site-specific safety plan and verify the inclusion of OSHA 1926.
CMG 4800	
CMG 4900	<ul style="list-style-type: none"> • Continue recent revision to include two projects in this class (Commercial Building Bid and Design-Build) along with a major presentation (to area professionals, the CMG-IAB members, CMG faculty, and others).
CMG 4999	<ul style="list-style-type: none"> • Continue to provide a various course activities/events (webinars, videos, guest speakers, tours,...) related to professional development. • Incorporate BIM (Revit) into the course (assuming enrolled students lacking expertise in this area). • This course will be eliminated after 2016 (new course on BIM and Revit to begin).
Other	<ul style="list-style-type: none"> • Restrict the Business Electives to require at least one Business Management Elective. This will ensure coverage of “principles of management” in a Business course (implemented in fall 2010). • Replace the Free Elective with a Science Elective (Geology). This will fulfill the ACCE requirement for the Math/Science credits (implemented in fall 2010).

Appendix E: Preliminary Course/Instructor Evaluation Instrument (administer during the 4th or 5th week)

Preliminary Course/Instructor Evaluation

Course Number:

Instructor:

Course Name:

Date:

Please respond to the two questions listed below. Your brief, specific responses will provide important feedback to help me continuously improve this course.

- 1. What about this course, or my teaching, is helping you to learn?**

What could I change about this course, or my teaching, that would improve your learning?