Academic Program Outcomes and Assessment Plan
Construction Management
Colorado State University- Pueblo
2017-2018

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CONSTRUCTION MANAGEMENT at Colorado State University-Pueblo

The Construction Management Program is a part of the degree offerings at Colorado State University-Pueblo (CSU-Pueblo). CSU-Pueblo was established by state law. The following is from the University-catalog 2011-2012.

Colorado State University was established by state law:
"There is hereby established a University at Pueblo, to be known as Colorado State University-Pueblo, which shall be a comprehensive university with moderately selective admission standards. The University shall offer a broad array of baccalaureate programs with a strong professional focus and a firm grounding in the liberal arts and sciences. The University shall also offer selected masters-level graduate programs". (Colorado Statutes 23-31.5-101)

Colorado State University-Pueblo Statement:
"Colorado State University-Pueblo is committed to excellence, setting the standard for regional comprehensive universities in teaching, research and service by providing leadership and access for its region while maintaining its commitment to diversity" (Colorado State University-Pueblo Catalog, 2017-18, p. 13).

CONSTRUCTION MANAGEMENT Program Vision and Goals

The major in construction management leads to the Bachelor of Science (BS) degree in Construction Management (CM). Graduates of the CM program enter in the industry as project superintendents, field supervisors, project managers, or owner's representatives for a

variety of construction related firms such as general contractors, specialty subcontractors, construction mangers, designers, developers, consultants, or owners.

Program Goals:

The goal of the Construction Management Program is to prepare baccalaureate degree graduates who have the necessary skills to plan, organize, staff, lead and exercise control in the directing and coordinating of resources to achieve construction project objectives. Therefore, the objective of the program is to produce graduates who have the technical grounding in construction processes for infrastructure and have managerial skills to plan and direct projects.

The Construction Management Program also addresses the national and regional need to train construction professionals for predicted shortages in the workforce based upon a retiring existing workforce and need to rebuild the nation's infrastructure. CSU-Pueblo has been active in meeting the mission of adding program offerings relevant to the national and local trends. The following is statement from the university mission.

CONSTRUCTION MANAGEMENT Student Learning Outcomes

Students who successfully complete the CM program will have the ability to:

1. Apply knowledge, techniques, skills and tools of the construction industry in construction activities.
2. Select and apply the knowledge of mathematics, science and technology to construction problems.
3. Perform standard tests, organize and interpret test data and apply test results to improve construction processes.
4. Function effectively as members or leaders on construction teams.
5. Communicate effectively regarding subjects related to construction activities.
6. Demonstrate an understanding of professional and ethical responsibilities.

CONSTRUCTION MANAGEMENT Assessment Student/Program Outcomes

Student level assessment will take place in individual courses through a variety of methods. The CM curriculum map details the specific courses and the types of assessment used for each outcome.

An analysis of student retention and success are made with CM faculty. An annual faculty meeting will evaluate the need for change to curriculum. Suggested changes are then evaluated and discussed with the department chair. The industrial advisory committee will also be informed of the proposed changes. Upon a majority approval of interested parties the changes will be prepared by CM faculty. If changes warrant curriculum changes the program coordinator or CM faculty will prepare necessary information for submittal to the University CAP (Curriculum and Academic Policies) Board.

Colorado State University-Pueblo Construction Management Program Curriculum Map

Required Construction Management Courses

Student Learning Outcomes	CM 101	CM 231	CM 320	CM 330	CM 341	CM 351	CM 445	CM 451	CM 461	CM 465	CM 475	CET 102	CET 103	CET 115	CET 207	CET 208	CET 303	CET 304	CET 305
1. Apply knowledge, techniques, skills and tools of the construction industry in construction activities.	√	√, TS	√			√, PR, HW	√	√	√		√	√	√	√			√	√	√
2. Select and apply the knowledge of mathematics, science and technology to construction problems.		√, TS	√	√	√	√		√		√, TS		√	√	√	√			√	√, PR
3. Perform standard tests, organize and interpret test data and apply test results to improve construction processes.			√, RP, EA		√											√, RP			
4. Function effectively as members or leaders on construction teams.											√, WC	√, EA	√			√		√, PR	√
5. Communicate effectively regarding subjects related to construction activities.	√			√	√	√	√	√	√	√	√, PR, WC				√	√	√	√	√, PR, TS
professional and ethical responsibilities.	√						√	√	√, CS	√, EX	√				√		√		

	Intro to Construction Management	Statics & Strutures	Soils in Construction	Wood Structural Systems	Concrete & Steel Structures	Construction Planning & Scheduling	Construction Safety	Mechanical & Electrical Systems	Construction Law	Construction Accounting & Finance	Senior Project	Surveying I	Surveying II	Civil Drafting I	Construction Materials & Methods	Concrete & Asphalt Materials	Construction Management	Building Cost Estimating	Heavy/ Highway Cost Estimating
LEGEND of ASSESSMENT ACTIVITIES:																			
EA – Experiential Activity	QZ - Quiz																		
EX – Exit Exam	RP – Report																		
HW- Homework	SE – Semester Exam																		
OR – Oral Presentations	TS – Test																		
PR – Project	CS – Case Study																		
WC – Written Communication																			

Figure 1: Curriculum Map (See Appendix A)

Construction Management Online Courses - June 2016

During the 2014/2015 academic year the CSU-Pueblo CM faculty teamed together with CSU Global to develop courses for online delivery. The courses will be designed using a course design template (aka CDD-Course Design Document) to ensure consistency.

The CDD is constructed using 3 key team members. The team membership consists of 1 Program Coordinator (PC), 1 Content Expert (CE), and 1 Instructional Designer. Each team will develop a course that contains clearly stated course outcomes. Each course will be broken into numerous instruction modules. Each module will have clearly stated which will tie to the course level outcomes. Each module will be evaluated using various assessment instruments.

The CM faculty will develop a map (AY 2016-2017) which will map the link between the course level outcomes and the university Construction Management Student Learning Outcomes.

CONSTRUCTION MANAGEMENT Assessment Cycles, Analysis, Reporting and Improvement

While much of the assessment data is gathered at each course at differing levels in a variety of selected courses, a comprehensive review of all the material is completed in one of three cycles over a three-year period.

- Graduating seniors will be asked to complete an exit survey that provides feedback on the quality and usefulness of coursework for professional preparation.
- Employer surveys will be collected every three years
- Industrial Advisory Committee will meet at least once per academic year with a report being submitted every three years.
- Assessment reports will be provided at a fall departmental meeting to all faculty and interested parties within the program. The faculty will review and convene a meeting to prepare suggested changes for the program coordinator.
- Assessment materials will be collected annually unless otherwise noted and analyzed and reported on a three-year cycle as follows.

The following information is a detailed plan for each cycle.

Cycle 1 (2017- 2018)

Student Learning Outcome #3:

Student Learning Outcome (SLO) #3 will be addressed multiple times in the 14 required courses (CM or CET prefix) exact courses can be found in the attached curriculum map. Samples of experimental activities (EA) will be collected in CM 330 as per the curriculum map. The Experimental Activities will be evaluated against a specific rubric to judge effectiveness and or competence level during cycle #1. The results will be shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

Student Learning Outcome #4

Student Learning Outcome (SLO) #4 will be addressed multiple times in the 14 required courses (CM or CET prefix) exact courses can be found in the attached curriculum map. Samples of projects (PR) will be collected in CM 475 as per the curriculum map. The project will be evaluated against a specific rubric to judge effectiveness and or competence level during cycle #1. The results will be shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

Cycle 2 (2018-2019)

Student Learning Outcome #1

Student Learning Outcome (SLO) #1 will be addressed multiple times in the 14 required courses (CM or CET prefix) exact courses can be found in the attached curriculum map. Samples of projects (PR) will be collected in CM 351 as per the curriculum map. The project will be evaluated against a specific rubric to judge effectiveness and or competence level during cycle #2. The results will be shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

Student Learning Outcome #5

Student Learning Outcome (SLO) #5 will be addressed multiple times in the 14 required courses (CM or CET prefix) exact courses can be found in the attached curriculum map. Samples of projects (PR) will be collected in CM 475 as per the curriculum map. The project will be evaluated against a specific rubric to judge effectiveness and or competence level during cycle #2. The results will be

shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

Cycle 3 (2019-2020)

Student Learning Outcome #2

Student Learning Outcome (SLO) #2 will be addressed multiple times in the 14 required courses (CM or CET prefix) exact courses can be found in the attached curriculum map. Samples of projects (PR) will be collected in CM 475 as per the curriculum map. The project will be evaluated against a specific rubric to judge effectiveness and or competence level during cycle #3. The results will be shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

Student Learning Outcome #6

Student Learning Outcome (SLO) #6 will be addressed multiple times in the 14 required courses (CM or CET prefix) exact courses can be found in the attached curriculum map. Samples of case studies (CS) will be collected in CM 461 as per the curriculum map. The project will be evaluated against a specific rubric to judge effectiveness and or competence level during cycle #3. The results will be shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

CONSTRUCTION MANAGEMENT Curriculum:

The Construction Management program utilizes numerous academic units from within the university to encapsulate the required courses. In order to achieve the expected students outcomes, students are required to successfully complete a defined academic curriculum that includes the CM-33%, CET-23%, Business and Management-15%, Math and Science- 12%, -Computer-2% and General Education-10% courses listed below.

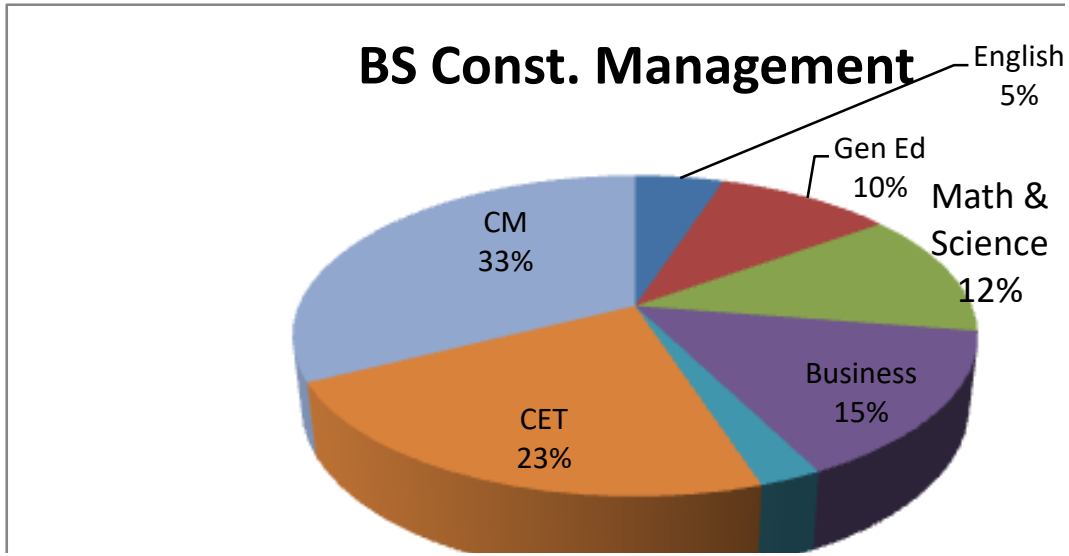

Figure 2: Curriculum Distribution Chart

Current Curriculum for CM at Colorado State University-Pueblo

Construction Management Courses:

CM 101: Intro to Construction Management
CM 231: Statics and Structures
CM 320: Soils in Construction
CM 330: Wood in Structural Systems
CM 341: Concrete and Steel Structures
CM 351: Construction Planning and Scheduling
CM 445: Construction Safety
CM 451; Mechanical & Electrical Systems
CM 461: Construction Law
CM 465: Construction Accounting & Finance
CM 475: Senior Project
Approved CM Electives
Approved Technical and Management Electives

Civil Engineering Technology Courses:

CET 102: Surveying I
CET 103: Surveying II
CET 115: Civil Drafting I
CET 207: Construction Materials & Methods
CET 208: Concrete & Asphalt Materials
CET 303: Construction Management
CET 304: Building Cost Estimation
CET 305: Heavy/Highway Cost Estimation

Business and Management Courses:

ACCTG 201: Principles of Financial Accounting
BUSAD 270: Business Communications
BUSAD 302: Ethics In Business
ECON 201: Principles of Macroeconomics
ECON 202: Principles of Microeconomics
MGMT 201: Principles of Management

Math, Science and Computer Courses:

Required Semester Hours: **18 semester hours**

CIS 100: Intro to Word & Windows
CIS 103: PowerPoint & Web Publishing
CIS 104: Excel Spreadsheets
MATH 121: College Algebra
MATH 156: Statistics
CHEM 111/L: Principles of Chemistry/Lab
Or
GEOL 101/L: Geology/Lab
PHYS 201/L: Principles of Physics I/Lab

Required General Education Courses:

As listed in the CSU-Pueblo Catalog

Evaluation of Assessment Results: In general, for each course, the results of assessment of student activities are evaluated, weighted and used to produce a normalized metric. Typically, the normalized metric is the summary used to indicate **whether** and **how** an

individual student meets the expected learning objectives. The Construction Management Program is committed providing quality education and assuring that students gain the skills necessary to be successful after graduation. The assessment process uses accepted best practices which provide information to evaluate program structure, course content, industry relevance and educational pedagogy. The CM faculty uses this information as the catalyst to make changes, strengthen content, compare necessity and enhance instruction.

Example of the Assessment Process: Each Student Learning Outcome (SLO) will be addressed multiple times in the 14 required courses (CM or CET prefix) exact course can be found in the attached curriculum map. A random sample of specific artifacts will be collected in defined courses as per curriculum map. Artifacts will vary in type based upon the SLO or the course type. The artifacts will be evaluated against a specific rubric to judge effectiveness and or competence level during the appropriate cycle for that SLO. The results will be shared with the CM faculty and key persons at regularly scheduled meetings. Recommendations for change or update, if needed, will be completed in accordance with the process defined in the in this plan.

Continuous Process: The CM Program faculty recognizes the rapidly changing industry and needs for the construction manager to stay cutting edge and relevant in the market-place, therefore the assessment process is an ongoing continuous effort. We are committed to constantly evaluate and willing to change to help keep graduates prepared and equipped for gainful employment and valuable citizenship.

Appendix A: Curriculum Map

Colorado State University-Pueblo Construction Management Program Curriculum Map

Required Construction Management Courses

Student Learning Outcomes	CM 101 Intro to Construction Management	CM 231 Statics & Structures	CM 320 Soils in Construction	CM 330 Wood Structural Systems	CM 341 Concrete & Steel Structures	CM 351 Construction Planning & Scheduling	CM 445 Construction Safety	CM 451 Mechanical & Electrical Systems	CM 461 Construction Law	CM 465 Construction Accounting & Finance	CM 475 Senior Project	CET 102 Surveying I	CET 103 Surveying II	CET 115 Civil Drafting I	CET 207 Construction Materials & Methods	CET 208 Concrete & Asphalt Materials	CET 303 Construction Management	CET 304 Building Cost Estimating	CET 305 Heavy/ Highway Cost Estimating
1. Apply knowledge, techniques, skills and tools of the construction industry in construction activities.	√	√, **TS**	√			√, **PR, HW**	√	√	√		√	√	√	√			√	√	√
2. Select and apply the knowledge of mathematics, science and technology to construction problems.		√, **TS**	√	√	√	√		√		√, **TS**		√	√	√	√			√	√, **PR**
3. Perform standard tests, organize and interpret test data and apply test results to improve construction processes.			√, **RP, EA**		√											√, **RP**			
4. Function effectively as members or leaders on construction teams.											√, **WC**	√, **EA**	√			√		√, **PR**	√
5. Communicate effectively regarding subjects related to construction activities.	√			√	√	√	√	√	√	√	√, **PR, WC**				√	√	√	√	√, **PR, TS**
6. Demonstrate an understanding of professional and ethical responsibilities.	√						√	√	√, **CS**	√, **EX**	√				√		√		

LEGEND of ASSESSMENT ACTIVITIES:

EA – Experiential Activity	QZ - Quiz
EX – Exit Exam	RP – Report
HW- Homework	SE – Semester Exam
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