

# AY 2014 – 2015 Program Review

Construction Management



# AY 2007-2014 Program Review Self-Study

Construction Management

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#### PART 1 – INTRODUCTION AND PROGRAM OVERVIEW

#### A. Program Overview

Based upon demand as stated by local industry professionals, the need for this program was identified and evaluated for feasibility. Construction Management employees with the appropriate knowledge and skill sets were in short supply. Based on this statement and an evaluation for feasibility, Colorado Mesa University moved forward and created the Construction Management program.

Construction Management is the discipline of planning, organizing, directing and controlling the labor, material and equipment required to construct and deliver a completed construction project to a private or public owner. It is a team effort in which each participant works to achieve the project objectives. Project objectives are generally stated as: delivering the project on or ahead of schedule, at or under budget, achieving the required level of standards and quality, maintaining a safe project site and having a minimal impact on the natural environment.

Many professional career opportunities exist with an earned bachelor of science in construction management. Examples of entry level positions in the construction industry include field engineer (assistant superintendent), project engineer (assistant project manager), junior estimator and scheduler.

The Bachelor of Science degree in Construction Management was created in 2007 in an effort to fill a need in the Grand Valley and surrounding counties for a university level degree in construction management. In the past 15 years, nationwide, construction contractors have begun to fill entry level construction management positions drawing on college graduates from construction management programs. This is a significant change from the traditional promotion of craft persons working in the field.

The Construction Management Program at Colorado Mesa University is broken down into three content areas of study:

- Construction Science This content includes a study of building materials and methods; mechanical, electrical, and plumbing systems; construction equipment; surveying; structure analysis; statics; soils; foundations.
- Construction Project Management This content includes a study for the interpretations of
  plans and specifications, building codes, project delivery, contracts, bonding, permits,
  scheduling, estimating, quality management, safety management, environmental management,
  regulatory issues, and internships.
- Construction Business Management This content includes a study of company and project accounting systems, finance, company strategic business planning, legal environment of business, and human resource management.

Graduates of the program are currently employed by small, medium and large companies at the local, regional and national level. Graduates are actively involved in many areas of construction management including: residential, commercial, roads, bridges, educational buildings, pipe lines and nuclear power plants.

#### B. Program History

- 2006 Exploratory study conducted to determine the feasibility of a construction management program to exist at Colorado Mesa University.
- 2006 Dr. Larry Grosse is commissioned by the University to develop a construction management program to exist in the Department of Business.
- 2007 Mr. Charles Gains is hired as an assistant professor and program director
- 2007 First Construction Management (CM) classes are offered Fall Semester 2007
- 2008 Colorado Mesa University Construction Management Program becomes a member of The Associated Schools of Construction (ASC)
- 2009 Bailey Behrman becomes the first CM graduate from Colorado Mesa University
- 2011 Ms. Kelly Bevill is hired as a second assistant professor for the Construction Management Program
- 2012 Students from the CM program compete and win 3rd place honors in the Heavy Civil category at the annual ASC Regions 6 Student Competition and Conference held in Sparks, Nevada
- 2013 Mr. Troy Miller is hired an assistant professor and program director for Construction Management program.
- 2014 Program curriculum is reviewed for articulation with Western Colorado Community College (WCCC) CONC courses, cohesion with University requirements and standards of national construction accrediting bodies as benchmarks to measure program quality.

#### C. Recommendations from Previous Program Review

No Program Review has been conducted prior to this review since the program began in 2007.

#### D. Program Mission and Objectives Mission statement and goals for the program, including the program's centrality to CMU's role and mission and strategic plan, and as applicable, how it adds value to the region

The Construction Management Program at Colorado Mesa University exists to provide quality, practical and theoretical construction education for students seeking a career in the residential, commercial, heavy civil and industrial sectors of the construction industry.

#### \*Statutory Role and Mission

The role and mission of the institution was reenacted in 2010 by the Colorado General Assembly (Colorado Revised Statutes 23-53-101) and amended in 2011 when Mesa State College was renamed Colorado Mesa University:

There is hereby established a university at Grand Junction, to be known as Colorado Mesa University, which shall be a general baccalaureate and graduate institution with selective admission standards. Colorado Mesa University shall offer liberal arts and sciences, professional and technical degree programs

and a limited number of graduate programs. Colorado Mesa University shall also maintain a community college role and mission, including career and technical education programs. Colorado Mesa University shall receive resident credit for two-year course offerings in its commission-approved service area. Colorado Mesa University shall also serve as a regional education provider.

(Source: https://www.coloradomesa.edu/about/values.html; Retrieved June 5, 2014)

#### \*\*Institutional Mission Statement

Committed to a personal approach, Colorado Mesa University is a dynamic learning environment that offers abundant opportunities for students and the larger community to grow intellectually, professionally, and personally. By celebrating exceptional teaching, academic excellence, scholarly and creative activities, and by encouraging diversity, critical thinking, and social responsibility, CMU advances the common good of Colorado and beyond.

(Source: https://www.coloradomesa.edu/about/values.html; Retrieved June 5, 2014)

#### E. Support of other majors/minors and general education requirements

Currently no other majors/minors require CONM courses.

Currently there are not CONM courses that are accepted to fulfill general education requirements

#### F. Location/comparative advantage

Geographically, Colorado Mesa University is located in Western Colorado, and is one of four universities (Colorado State University, Colorado State University – Pueblo, University of Denver) in the state of Colorado that offers a Bachelor of Science degree in construction management. Figure 1.F is a comparison of courses taught by the four construction management programs in the state of Colorado, with supporting documentation found in Appendix 1. Denver University's construction management program differs substantially in comparison to the other three programs in the state of Colorado. The program at Denver University is specific to residential development and construction. The construction management programs at the other three Colorado universities are similar programs. Observed differences are described as follows: 1 – Colorado Mesa University holds a slight bias towards technical and engineering; 3 – Colorado State University-Pueblo holds a slight bias towards heavy civil construction. Currently Colorado Mesa University's construction management program is providing a needed professional entry level employee for the construction industry in Western Colorado and beyond.

Table 1.F
Course Comparisons of Colorado Universities

CMU	CSU	CSU - Pueblo	Denver University
CONC 101		CM 445	
CONC 116	CON 151		
CONC 161	CON 360/371	CET 207	
CONC 208	CON 366		
CONC 218	CON 261	CET 102/103	

CONM 181	CON 101	CM 101	
CONM 264*	CON 131	CET 115	
CONM 316	CON 251	CM 341	
CONM 340	CON 365	CET 304	CMGT 3100
CONM 361	CON 360/371	CM 451	
CONM 362	CON 359	CM 231	
CONM 370	CON 317		
CONM 401	CON 462	CM 465	
CONM 462	CON 469	CET 208/CM 320	
CONM 472	CON 461	CM 351	CMGT 3120
CONM 480	CON 351/367	CET 303	
CONM 485			
ACCT 201	ACT 205	ACCTG 201	ACTG 2200
STAT 200	STAT 204	MATH 156	
MATH 141			
BUGB 349	BUS 205	CM 461	LGST 2000
FINA 301			FIN 2800
MANG 371	MGT 305	MGMT 201	MGMT 2100
PHYS 111/111L	PH 121	PHYS 201/L	
PHYS 112/112L			
	GEOL 120/121		
	CON 265		
	CON 459		
	CON 465	CM 475	
	MATH 126		
	MATH 141		
		BUSAD 270	
		BUSAD 302	
		CIS 100/103/104	
		CET 305	
		CM 330	
			BUS 100
			ACTG 2300
			MKTG 2800
			INGO 2020
			MGMT 2850
			MGMT 3800
			CMGT 2110
			CMGT 2160
			CMGT 2170
			REAL 1777
			REAL 3307
			CMGT 3300, 3301
			CMGT 3190

#### G. Unique characteristics of the program

While perhaps not unique in Construction Management programs, the overwhelming support of the local construction industry has been instrumental in the development and continuation of the program and is worth noting. The industry has provided scholarships, student support, classroom support, lab support and advisory board participation from the inception of the program.

A second unique characteristic is the relationship between CM and WCCC which is an incredible opportunity for some students. Students that are not admitted to CMU due to the selective university status, have the ability to accomplish coursework required for the BS degree in construction management while proving themselves at WCCC before admission to CMU.

Existing as a program in the Department of Business, students are provided with a solid business background, an important CM skill needed. In response to this need, the 3 plus 2 program in construction management was created allowing student to graduate in five years with their undergraduate degree in construction management and their MBA. The value of this degree is the combination of the increased business classes in addition to the CM classes that are required, a skill set which employers are requesting.

#### H. Other information/data (program's option) - None

#### PART 2 - CURRICULUM

#### 1. Program Curriculum

The curriculum for the Bachelor of Science degree is delivered in the following content areas:

- Essential Learning These classes provide the base knowledge needed for both construction management and a well-rounded education developing life skill set.
- Construction science Building materials and methods; mechanical electrical, and plumbing systems; construction equipment, surveying; structure analysis; statics; soils; foundations
- Construction Project Management Interpretation of plans and specifications, codes, project delivery, contracts, bonding, permits, scheduling, estimating, quality management, safety management, environmental management, regulatory issues and internships.
- 4. Construction Business Management Primary and project accounting systems, finance, company strategic business planning, legal environment of business, human resource management. The curriculum is designed to prepare the student with the knowledge and skill sets to assume entry level construction management positions for all industry sectors. Examples of entry level positions include, field engineer (assistant field superintendent), project engineer (assistant project manager), estimator, and scheduler. Alumni can expect promotion to field superintendent, project manager, senior estimator and positions in construction company management and ownership.

#### 2. Program Currency

The inaugural "Program Sheet" for the Construction Management Program was published for the 2008-2009 academic year. The following are identified changes made through the 2014-2015 Program Sheet:

2008-2009	Inaugural Program Sheet*
2009-2010	MANG 201 – Principles of Management was removed as a requirement and replaced with a CONM 181 – Principles of Construction Management.*
2011-2012	STAT 200 – Probability of Statistics and MATH 141 – Analytical Geometry were added to the 'Required Core'; CONM 485 – Construction Management Issues was added as a Required Concentration Course.*
2012-2013	CONC 251 – Construction Preparation (Codes, Permits, etc.) was removed as a requirement and CONM 264 – Mechanical and Industrial Systems was added as a requirement.*

<sup>\*</sup>See Appendix 2

#### 3. Program Delivery

Currently all Construction Management courses are taught in the traditional lecture and lecture/lab format at the Colorado Mesa University Main Campus, WCCC campus and the Archuleta Engineering Center in Grand Junction, Colorado.

Course Prefix & Number	Course Title	Day/ Night	Site	Mode
CONC 101	Construction Safety & Regulations	N	В	С
CONC 116	Building Materials	N	В	С
CONC 161	Building Mechanical & Electrical	N	В	С
CONC 208	Construction Equipment	N	В	С
CONC 216	Surveying	N/D	В	С
CONM 181	Principles of Construction Management	D	M/B	С
CONM 234	Mechanical and Industrial Systems	D	В	С
CONM 316	Construction Material and Methods	D	В	С
CONM 340	Construction Estimating	D	В	С
CONM 361	Advanced Building Systems	D	В	С
CONM 362	Structure Analysis – Statics/Materials Strength	D	В	С
CONM 370	Managing Safety and the Regulatory Environment	D	M/B	С
CONM 401	Construction Financial Management	D	M/B	С
CONM 462	Soil and Foundation Construction	D	U	С
CONM 472	Planning and Scheduling	D	В	С
CONM 480	Project Management	D	В	С
CONM 485	Construction Management Issues	D	В	C
CONM 499	Internship in Construction Management	DEM		

D ...... Day (ends by 5 p.m.)

N ...... Night (begins at 5 p.m. or later)

DEM ... Course offered on demand

M ...... Main Campus

B ...... Bishop Campus (AEC Building)

U ...... Located at United Companies of Grand Junction

C ...... Traditional classroom instruction

The curriculum is designed to prepare students for employment in both vertical and horizontal building as well as residential and commercial. In addition, due to location, pipelines, rig pads and roads are also demand emphases. As the program grows, a goal is provide students with more specificity in the degree, allowing the student to focus on for example, heavy civil. Other in-demand areas of emphasis include sustainable and green building. The focus on green building and sustainability is projected to continue.

#### PART 3 – ANALYSIS OF STUDENT DEMAND AND SUCCESS

#### A. Table 3.1 Number of majors

HE SERVICE	The state of			2009-	-10	2010-	-11	2011-	-12	2012-	-13	2013-	14
Program	Degree	Code	Major	1 <sup>st</sup> Major	All	1 <sup>st</sup> Major	All	1 <sup>st</sup> Major	All	1st Major	All	1 <sup>st</sup> Major	All
Construction	PB	2903	CMPB			5	5	4	4	5	5	10	10
	CM	3180	CM	58	64	68	73	58	66	60	64	64	67
Subtotal				58	64	73	78	62	70	65	69	74	77

As indicated in the above table, the number of majors from the academic years 2009-10 through 2013-13 has increased from 64 to 77, representing an approximate increase of 20%. It is noted that during the range of years for this program review, the growth of majors was not a linear growth. In the 2010-11 academic year the number of majors hit an all-time high of 78 and then decreased to 69 in the 2012-13 academic year. Two points should be noted: 1. the range of years in this program review reflect the inaugural years for the construction management program at Colorado Mesa University and; 2. the range of years in this program review occurred during years where the construction industry was depressed due to what is now referred to as The Great Recession.

B. Table 3.2

Registration and student credit hours by student level

	Student	2009-	10	2010-11		2011-	12	2012-	13	2013-14	
Subject	Level	Enrolled	SCH								
CONM	FR	8	24	6	18	1	3	5	15	10	30
	SO	5	15	10	30	18	54	11	33	16	48
	JR	4	12	13	39	10	30	31	93	26	78
	SR	53	159	67	189	86	258	52	156	123	369
CONM	Total	70	210	96	276	115	345	99	297	175	525

Student registration for credit hours by student level has increased at all levels from 2009-10 to 2013-14. There were 70 enrolled students and 210 student credit houses at all levels in 2009-10. This increased to 175 enrolled students and 525 student credit hours at all levels in 2013-14, an increase of 250%.

C. Table 3.3

Registration and student credit hours by course level

	Course	2009-	10	2010-	11	2011-	12	2012-	13	2013-	14
Subject	Level	Enrolled	SCH								
CONM	100	17	51	19	57	21	63	19	57	28	84
	200									14	42
	300	27	81	48	144	52	156	58	174	71	213
	400	26	78	29	75	42	126	22	66	62	186
1 1 100 000		70	210	96	276	115	345	99	297	175	525

<sup>\*</sup>Most core construction courses at the 100 and 200 level are taught though Western Colorado Community College (WCCC)

Currently program courses taught by Colorado Mesa University at the 100 and 200 level are limited.\*

CONM 181 – Principles of Construction Management has been offered since 2009-10 and is the only 100 level course taught by the CMU Construction Management Program. CONM 264 – Mechanical/Industrial Systems was initially offered fall semester 2013 with an enrolment of 14 students. The two current fulltime construction management faculty teach the 300 and 400 level courses.

#### D. Table 3.4

#### Number of graduates

			13 10 7	2009-	-10	2010-	11	2011-	12	2012-	-13	2013-	14
Program	Degree	Code	Major	1 <sup>st</sup> Major	All	1st Major	All	1 <sup>st</sup> Major	All	1 <sup>st</sup> Major	All	1 <sup>st</sup> Major	All
Construction	BS	3180	CM	1	1	6	6	8	8	8	8	8	8
Subtotal				1	1	6	6	8	8	8	8	8	8

As of Spring Semester 2014, thirty-one (31) students have earned baccalaureate degrees in Construction Management from Colorado Mesa University, since the program's first graduate in 2009.

#### E. One-year retention rates and four-and six year graduations rates

Table 3.5
Freshman Retained to Second Fall

Retain	ed to second fal	1					
Entry Fall	Retained   Retained   CONM   In CO		Retained other major	Not retained	% Retained in CONM		
2008	10	9	0	1	90%		
2009	17	9	1	7	53%		
2010	13	7	2	4	54%		
2011	8	6	1	1	75%		
2012	5	2	1	2	40%		
2013	9	4	0	5	44%		

Many of the students beginning as CM Freshman remain as Construction Management students.

Table 3.6 Graduates in 4-years

Gradua	ated in 4 years				
	Freshmen CONM Majors	Graduated in CONM	Graduated other major	Did not Graduate	% Graduated in CONM
2008	10	4	0	6	40%
2009	17	1	0	16	6%
2010	13	1	0	12	8%

Since many of the CM students have outside employment opportunities, graduation may take longer since the student is working or the student may choose to work rather than finish the degree.

Table 3.7 Graduates in 6 years

Gradu	ated in 6 years					
	Freshmen CONM Majors	Graduated in CONM	Graduated other major	Did not Graduate	% Graduated in CONN	
2008	10	4	0	6	40%	

Due to employment opportunities, it may take some CM students longer to finish the degree.

#### F. Student successes/recognitions, especially in external student competitions

Starting in 2010, Colorado Mesa University's construction management program has participated in the Associated Schools of Construction's (ASC) Region 6 Annual Student Competition and Conference. This conference is an opportunity for students to showcase their education to industry professionals whose purpose is to recruit potential employees. Students also are able to network with industry professionals in a series of hospitality events, as well as attend a Construction Management job fair hosting between 125-150 construction industry-related companies.

Colorado Mesa University's participation has generated exposure of the construction management program to potential employers. Recently two companies have contacted the CMU construction management program, who had viewed student participation in this ASC event. Both Lithko Contracting, (Ohio) and Quest Constructors (Arizona) have visited campus and hired students as interns, based upon student performance at the Competition. Both have expressed interest in continuing a relationship with the CMU CM program.

In 2012 a group of construction management students representing Colorado Mesa University in the competition category titled "Heavy Civil" won third place honors in Region 6. Also in 2012 Student Lori Siegesmund received honors for best presenter.

Students also participate in the annual BYU CM Challenge. This is a smaller competition hosted by Brigham Young University in Provo Utah, and somewhat similar to the ASC event in Sparks, Nevada. Other participating schools include: Brigham Young University, Utah Valley University, Weber State University, Southern Utah University and BYU-Idaho

Colorado Mesa University construction management students have also found success at the BYU CM challenge, winning first place honors in 2012 and second place honors in 2013 in the heavy-civil category. Daniel Smith also received honors from the presentation of his construction schedule in 2013.

Several groups of CM students have participated in the CMU Student Showcase held each year Spring Semester. An example of presenters include the following: Steven Jones, Sam Hollar with a presentation entitled Suspension Bridge Load and Cost Analysis; Seth Rains and Daniel Bonilla with a presentation entitled (Acpm) Club And The National Associated Schools Of Construction Competition.

Graduates have found success in the construction industry. David Fife (2010) currently works locally for United Companies as a quality control manager, several students have been hired and are working for construction companies listed in the ENR (Engineering News of Record) Top 400 contractors Kiewit (3), PCL (6), FCI (244) and Shaw Construction (297).

Other information/data (program's option) - None

#### PART 4 - ACADEMIC PROGRAM RESOURCES

#### A. Faculty

The construction management program currently has two tenured track faculty holding the rank of assistant professor. Additional faculty resources are utilized through Western Colorado Community College where a full-time faculty member and one adjunct professor teach core construction courses used to fulfill major requirement for the BS in Construction Management.

Kelly Bevill, PE has a MS degree in civil engineering\*
Troy Miller, MS has a BS and MS degree in construction management\*

#### 1. Ratio of full-time equivalent students (FTES) to full-time equivalent faculty (FTEF)

		2009-10			2010-11			2011-12			2012-13			2013-14	
Subject	FTES	FTEF	FTES:	FTES	FTEF	FTES: FTEF	FTES	FTEF	FTES: FTEF	FTES	FTEF	FTES:	FTES	FTEF	FTES: FTEF
CONM	7.0	1.1	6.2	9.2	1.2	7.9	11.5	1.5	7.7	9.9	1.5	6.6	17.5	1.8	10.0

# 2. Course credit hours and student credit hours by faculty type (i.e. tenured/tenure-track), instructor, administrators/staff/coaches, lecturers

Courses are divided between faculty, aligning areas of expertise with course content, with the current faculty resources as shown in the below table.

			20(9-10			2010-11			2011-12			2012-13	i.		2013-14	
Subject	Faculty Type	CCH	SCH	%SI	CCH	SCH	%St	CCH	SCH	%S1	CCH	SCH	%S1	CCH	SCH	%St
CONM	T/TT	3	3	1%				18	162	47%	36	297	100%	42	525	100%
	FT/NonTT	24	207	99%	28	276	100%	18	183	53%						
CONM To	tal	27	210	100%	28	276	100%	36	345	100%	36	297	100%	42	525	100%

Course				2009-10			2010-11			2011-12							
CM	Title	Cr Hr	Sec	Enrolled	SCH	Sec	Enrolled	SCH	Sec	Enrolled	SCH	Sec	Enrolled	SCH	Sec	Enrolled	SCH
181	Princ of Construction Mgmt	3	1	17	51	1	19	57	1	21	63	1	19	57	2	28	84
264	Mechanical/Industrial Systems	3													1	14	42
316	Const Materials & Methods	3	1	10	30	1	11	33	1	11	33	1	13	39	1	13	39
340	Construction Estimating	3				1	9	27	1	14	42	1	11	33	1	14	42
361	Advanced Building Systems	3	1	6	18	1	10	30	1	10	30	1	9	27	1	22	66
362	Statics/Material Strength	3				- 1	12	36	1	9	27	1	8	24	1	12	36
370	Safety and Regulatory Env	3	1	11	33	1	6	18	1	8	24	2	17	51	2	10	30
401	Construction Financial Mgmt.	3	1	5	15	1	7	21	1	11	33	1	4	12	1	16	48
462	Soil and Foundation	3	1	8	24	1	10	30	1	4	12	1	6	18	1	13	39
472	Planning and Scheduling	3	1	7	21				1	12	36	1	5	15	1	14	42
480	Project Management	3	1	5	15	1	6	18	1	12	36	1	5	15	1	14	42
485	Construction Management Issues	3							1	2	6				1	5	15
496	Topics	1				1	6	6									
499	Construction Internships	3	1	1	3	1190			1	1	3	1	2	6			
CONM T	( al		9	70	210	10	96	276	12	115	345	12	99	297	14	175	525

# 3. Faculty successes/quality/recognitions – details related to teaching, advising, scholarship, service and other achievements

<u>Kelly Bevill, MS, PE</u> is a fulltime tenure track assistant professor. Kelly holds a Bachelor of Science degree in Environmental Engineering from the University of Colorado (2002), and a Master of Science degree in Civil and Environmental Engineering from Cornell University (2005). Kelly is also a registered professional engineer in the state of California.

<sup>\*</sup>See Appendix 4 for educational and professional vita

Troy Miller, MS is a fulltime tenure track assistant professor. Troy holds a Bachelor of Science degree in Construction Management from Brigham Young University (1999), and Masters of Science degree in Construction Management from Colorado State University (2004). Troy previously taught construction management courses at Brigham Young University Idaho for nine years, prior to joining the faculty and Colorado Mesa University in 2013. Prior to pursuing a teaching career Troy worked in the construction industry as an Assistant Project Coordinator, Project Manager, and Construction Estimator. Troy has also provided freelance estimating, scheduling and software training services to various general contractors and suppliers of the construction industry.

Both faculty are actively involved in student advising and advising with the student club. The handson nature of the CM curriculum and club activities provide numerous opportunities for faculty-student interactions to occur regularly.

#### B. Financial Information (Finance and budget):

		Y									r —			
			FISCAL YEA	R 2009	FISCAL YEA	AR 2010	FISCAL YEA	R 2011	FISCAL YEA	R 2012	FISCAL YEA	AR 2013	FIS CAL YEA	R 2014
Org 113	0-		ORIGINAL	YTD	ORIGINAL	YTD	ORIGINAL	YTD	ORIGINAL	YTD	ORIGINAL	YTD	ORIGINAL	YTD
		DOM ACCT TITLE	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL*
1130	52.56	CN REGULAR FT WAGES	87,820	97,955	104,197	103,889	106,699	116318	158,686	171,044	176,703	147,064	155,521	155,832
1130	5276	CN REGULAR PT WAGES		-	-	43		-	11,905			30000		
113/0	5286	CN TEMPORARY FT WAGES		-	-	-	8,400	-				-	-	-
1130	5296	ON TEMPORARY PT WAGES			-	6,329		7,688	8,400	2,076	1,800	1,800	1,800	1,075
1130	53.56	ON ANNUAL LEAVE PAYMENTS		701	-	727		1,119	-	381		3,523		1,378
1130	5896	CN SICK LEAVE PAYMENTS		130	-	-	-	-		-			-	130
1130	5415	CN DCPP TIA A CREF		~	-	4	-	1,004	-	1,226		5,948		10,225
1130	5425	CN DCPP FIDELITY				6		28		5,711		6,156		5,325
1130	5436	CN DCPP VALIC		10,654	-	11,439	4	11,522		11,555		1,371		
1130	5445	CN FICA-MEDICARE CONTRIBUTION		1,369		1,566		1,758		2,425		2,114		2,150
113/0	5456	ON OTHER RETIREMENT PLAN			-		4						7,773	
1130	5456	CN PERA	22,248		13,494	551	13,408	552	24,452	149	20,443	183	15,554	10B
1130	5458	CN PERA - AED	-		-	125	-	184	-	58		61		40
1150	5459	CN PERA - SAED	-	-	-	73		138	-	49	-	54	100	37
1130	55/06	CN DENTAL INSURANCE		428		760	-	785		798	-	444		565
1130	5516	ON HEALTH INSURANCE	10,250	5,070	11,121	6,548	11,886	10914	30,680	13,020	21,394	10,698	22,448	15,142
1130	5520	CN HSA MATCHING	-	1,980	-	990	-	-		7				512
1150	5525	CN LIFE INSURANCE	- 2	406	-	413	~	471	-	718		403		33 B
1150	55.56	CN DISABILITY		247		255		275		402	-	290		
1130	5706	STUDENT ASSISTANTS				291	8,000	2,657	8,000	4,265	E,000		8,000	957
1130	61.00	PROFESSIONAL FEES EXTERNAL			-	2,237	1,000	408	1,000	125		1,722		
1130	6150	EMPLOYEE TRAVEL - IN STATE	600		600		600		2,457	1,029	B00		1,200	257
113/0	61.55	STUDENT TRAVEL - IN STATE	-		-	158		811	-	(*)	500		500	
1130	51.50	EMPLOYEE TRAVEL - OUT OF STATE	<u>_</u>	-		-	- 2	4.207		1,156	67			542
1130	51.55	STUDENT TRAVEL - DUT OF STATE		-		-		(4,922)	-		1,000		1,000	
1130	6201	SUPPLIES		590		2,184	5,300	3,024	6,300	2,376	5,800	1,354	7,370	2,504
1130	62.05	SUPPLIES - COURSE FEE FUNDED		-	_		-	-	500	-	500		500	
1130	6211	SOFTWARE				1,330	2,500	-	2,500	1,069	2,500		2,500	142
1130	6215	SOFTWARE - ACADEMIC	-	-	-	-	-		-	-	-			2,136
1130	6230	PRINTING OFF-CAMPUS		-		52	-	-	250	535	450		450	171
1130	62.55	TELECOMMUNICATIONS SERVICE	-	62			-				-			
1130	6310	SUBSICRIPTIONS & BODKS		944		7	-				-	1,402	-	€55
1130	6550	PERSONNEL RECRUITING - IN STATE				-		190						
1130	6401	TELEPHONE CALLS	150	145	150	114	200	37	200	41	55	11	45	15
1130	6410	TELEPHONE EQUIPMENT	750	363	750	1,188	792	1,485	792	1,947	1,980	2,277	2,376	2,046
1130	6430	POSTAGE	-			-				102				
1130	6450	FREIGHTIN				15	-							
1130	6470	DUES & MEMBERSHIPS		-	-	569		10	550	150	550	550	550	550
1130	5481	ADVERTISING - SEARCHES	-	-		70		279	-		-			-
1130	65.01	EQUIPMENT REPAIR & MAINTENANCE	-	-		1,336		(714)	-	450	500	66	1,500	
1130	65.50	MAINTENANCE SUPPLIES	,	-	-		-	-		176	-			
1130	6570	VEHICLE MAINTENANCE SUPPLIES	-			11			-	-				
1150	65.80	GAS AND OIL								47				
1130	57.50	RENT/LEASE EQUIPMENT				2,309	2,000	2,215	2,000	731	3,300	96B	3,300	1.015
1130	67.65	VEHICLE RENTAL				324		709		515		528		344
1130	6840	OFFICIAL FUNCTION MEETINGS SEMINAR		142										- 1
1130	6850	OFFICIAL FUNCTIONS						-				400		
1130	6980	OTHER COSTS					1,000		1,000		500	-	500	
1130	7150	PROFESSIONAL DEVELOPMENT						74			1			990
1130	81.00	EQUIPMENT NON-CAPITAL		4,844		21,556	-	284						
1130	8101	COMPUTER EQUIPMENT NON-CAPITAL		4,798		3,669	-	7		7,766				
1130	88.85	<b>BUDGETED CHANGE TO FUND BALANCE</b>				-				200				
1130	8090	CAPITAL EQUIPMENT	5 -	5 -	5 -	5 5,963	5 -	\$ (2,522	5 -	5 -	5 -	5 -	\$ -	5 -
		TOTAL EXPENDITURES		130823.4		-		1617145		232209.4		_	-	206292.74

#### C. Library Assessment

The Library Assessment indicated that the Library's electronic database encompass a wide range of construction management materials, but that the Monographic materials are limited. It should be noted specifically that the library, in monographic form, possesses the collection of the latest (2012) International Code Council (ICC) code editions. The library also possesses the International Journal of Construction Education and Research.

It is the recommendation of the construction management faculty, that additional library resources are acquired that will allow student to prepare to take specialized exams for industry credentials. Examples include the current LEED v4 Reference Guide.

Library Program Assessment John U. Tomlinson Library Colorado Mesa University

Date of Assessment: May 1, 2014

Purpose of Assessment: Program Review

Program under review: Construction Management (CM)

Program Level: Bachelor of Arts

Liaison: James Dildine

Collection Assessment: The Library of Congress subject headings used for this analysis were selected from catalog records for materials associated with Construction Management. Subject headings include: Building – Dictionaries; Building – Estimates; Building - Handbooks, Manuals, etc; Building Laws – United States; Building – Superintendence; Building – Quality Control; Construction Contracts; Construction Contracts – United States; Construction Contracts – United States – Handbooks, manuals, etc.; Construction industry – United States – Finance; Construction industry – United States – Management; Construction industry – United States – Quality Control; Construction industry – United States - Safety Measures; Construction industry – Safety Regulations – United States; Construction Industry – Safety Regulations – United States – Handbooks, Manuals, etc.; Constructors; Materials – Standards (all subheadings); Project Management (include subheadings); Safety Regulations; Safety Regulations – United States – Handbooks, Manuals, etc.

- 1. **Reference Support:** The following titles are representative of materials related to *construction management* held in the library reference area:
  - a. A dictionary of construction, surveying, and civil engineering, 2012
  - b. International building code, 2009
  - c. OSHA standards for the construction industry (29 CFR part 1926): with amendments as of January, 2009
  - d. Annual book of ASTM standards, 2008
  - e. Dictionary of architecture & construction, 2006
  - f. Illustrated dictionary of building design + construction, 2005
  - g. Construction glossary: an encyclopedic reference and manual, 1980
  - h. Dictionary of architectural and building technology, 1986

b. **Monographic Resources:** There were a total of (338) monographic sources identified from a search of the Library of Congress subject heading (outlined above). The majority of these materials were in paper format (228), while (110; w/some cross-over) were in electronic format. The following table shows the items by publication year:

2000 – 2014:	208
1990 – 1999:	91
1980 – 1989:	28
Before 1980:	11

- c. Periodicals: A subject search of the *Periodical Locator* from the Library's homepage indicates full-text availability (print or online) for 118 periodical titles related to Technology - Building Construction.
- d. **Electronic Resources:** The following online subscription indexes and databases provide coverage for this (Construction Management) concentration:

Academic Search Complete – Using the search term 'construction management' the following results were returned:

All sources, including inter-library loan	6,309
Full-text	5.118
Full-text, peer reviewed	3.744
Academic Journals	99

Business Source Complete – BSC provides full-text to over 2,300 journals including access to over 1,100 peer-review journals

LexisNexis – provides access to full-text articles from trade publications, under the category Construction, Metals, and Architecture News

OmniFile Select - The Applied Science and Technology section should also provide support for this program.

As an example of the volume of materials available to patrons, a subject search of *all* materials (including inter-library loan) indicates full-text availability of 488,511 items related to *Construction Management* [29,059 available as full-text, peer-reviewed]. Using the search terms *Construction Management* produces 360,426 available items from *all* the library resources, including inter-library loan. (86,482 available as full-text, peer-reviewed). Again using the search term *Construction Management* and the parameters full-text peer-reviewed electronic resources only, produced 3,640 items.

#### 2. Evaluation of the total collection

- Strengths: The library's electronic databases encompass a wide range of Construction Management materials.
- b. Weaknesses: Monographic materials are somewhat limited.

3.	Recommendations: Continue to add electronic databases and update reference and other monographic
	materials.

Library Director:	Sylvia L. Rael	Date: 10/20/14
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#### D. Physical Facilities

The construction management program is located in the Archuleta Engineering Center (AEC) located at 2510 Foresight Circle in Grand Junction Colorado. The building is currently being shared with the Mechanical Engineering Program, Manufacturing Technology Program and the Construction Technology Program. Physical space is described as follows:

- 1. Office Space four office spaces are dedicated for the construction management program. Two office spaces in the AEC are utilized as private offices for the two faculty member. The third office space is currently being used for the construction management program and club, and recently on a contingent basis, is being utilized by an adjunct faculty in the Construction Technology program. A fourth office has been provided on the main campus in Dominguez Hall (DH) 210E as a shared space for the construction management faculty when at main campus.
- Classroom Space Classroom space primarily is utilized in the AEC building and is shared with the
  above described programs. Space has also been available on main campus to teach some construction
  management courses.

Room AEC 123 is a classroom with 21 student computers and is the preferred space with the correct resources to teach CONM 264 – Mechanical/Industrial Systems, CONM 340 – Construction Estimating, CONM 472 – Planning and Scheduling. Each of these classes require intensive use of computer applications and software demonstration by the instructor.

Rooms AEC 203 and 204 are adequate to teach CONM 181 – Principles of Construction Management, CONM 361 – Advanced Building Systems, CONM 362 – Structure Analysis – Static/Materials Strength, CONM 370 – Managing Safety and the Regulatory Environment. Several of these courses have also been taught on main campus.

Rooms AEC 114 (Kiosk) and 137 (Highbay) is used to teach CONM 316 – Construction Material and Methods. The current course content makes this space the only location that this course can be taught. AEC 114 (Kiosk) is currently used for CONM 485 – Construction Management Issues. This space is only adequate to a capacity of eight students, due to the constraint of eight computers.

CONM 462 – Soil and Foundation Construction currently uses the facilities of a local contractor, United Companies.

AEC 114 (Kiosk) — This space, starting Spring Semester 2014, has been used as a rudimentary classroom, after a small investment to add a portable projection system, tables, and chairs. Utilization of this space as a classroom has created some undesirable outcomes. This space has eight private cubicles with computers that originally was intended for the construction management student as a study area. With the heavy utilization of AEC 123 and now AEC 114, students do not have access to the required resources to compete work outside of the designated class time. Specialty software that can only be accessed on these computers by students is unavailable due to heavy use of the room.

#### E. Instructional Technology and Equipment

Instructional technology utilized for the delivery of CONM courses is broken down as follows:

Computers, software and overhead projection – Lecture format courses typically utilize an instructor's station to display media, concepts, and examples to students. Assignments often are required to be generated using digital word processing and delivered in the same format or as a pdf file. Delivery may be in the form of a hard copy or emailed as a digital file. In some lecture/lab format courses, the student utilizes computer hardware and software to both learn concepts and skill sets, using specialized software applications. Courses utilize D2L as a medium to help facilitate the learning and evaluation process of the student. An example of how D2L is utilized---Students are required to read chapters of the textbook, which will be the topic of the next class meeting. A Question Set (open book quiz) is posted on D2L which the student is required to complete 10 minutes prior to the start of class where the topic will be discussed. D2L is also an efficient means to distribute course material, and overall course evaluation including current grade assessment.

Equipment – The Construction Management program is also in possession of a structural steel building mock-up, small lifting crane and skid steer utilized for teaching building materials and structures. Numerous other smaller pieces of equipment are located in the "cage" and checked out to students as needed. An efficiency in place is the ability to also share equipment with both the Mechanical Engineering and WCCC programs in areas like a power washer and a truck.

#### F. Efficiencies in the way the Program is Operated

Shared space – Currently the Construction Management program shares space in the Archuleta Engineering Center (AEC) with the Mechanical Engineering program, Manufacturing Technology program, and the Construction Technology program.

<u>Shared technology</u> – Computer labs and software currently are shared with the Mechanical Engineering, Manufacturing Technology and Construction Technology Programs.

Shared staff – The Archuleta Engineering center has two support staff members. Harriet Carpenter currently acts as the office assistant for the building, supporting all programs within. Bob Wilson is the facility lab assistant, helping in the classroom, labs, and performing basic building maintenance at this facility. Bob has been used in the CONM 316 – Construction Material and Methods Course as the safety monitor.

<u>Construction Technology Program (WCCC)</u> – The construction management program uses faculty resources from Western Colorado Community College to deliver many construction courses at the 100 and 200 level.

#### G. Other information/data (Program's option) - None

#### PART 5 – STUDENT LEARNING OUTCOMES AND ASSESEMENTS

#### A. Assessment of the program's student learning outcomes

All departments and programs at CMU are in the process of revising their program assessment processes. The Department of Business new SLOs are the following:

A CMU Department of Business graduate will be able to:

- Apply knowledge and skills in appropriate contexts and transfer knowledge and skills to new situations (critical thinking skills).
- Produce professional work products, independently and collaboratively (individual and team skills).
- Communicate clearly, appropriately, and persuasively to the audience, both orally and in writing (communications skills).
- Integrate knowledge from multiple functional areas of business to solve business problems and to develop sound business strategies (general business knowledge).
- Analyze business data critically, reason logically, and apply quantitative analysis methods correctly to develop appropriate conclusions (analytical skills).
- Properly and appropriately apply information to strategic decision making across functional business areas (strategic information systems knowledge).

To align with the departmental SLOs, the construction management faculty have identified the following student learning outcomes in the program:

- Critical Thinking Skills: Apply knowledge and skills in appropriate contexts and transfer knowledge and skills to new situations.
- 2. Individual or Team Skills: Produce professional work products, independently and collaboratively.
- Communication Skills: Communicate clearly, appropriately, and persuasively to the audience, both orally and in writing.
- 4. <u>General Business Knowledge</u>: Integrate knowledge from multiple functional areas of business to solve business problems and to develop sound business strategies.
- 5. <u>Analytical Skills</u>: Analyze business data critically, reason logically, and apply quantitative analysis methods correctly to develop appropriate conclusions.
- 6. <u>Information System Skills</u>: Properly and appropriately use information systems tools and techniques within functional business areas.
- 7. <u>Specialized Knowledge in Construction Management</u>: Identify, formulate and solve construction related problems by applying knowledge of mathematics, science and business principles.

Student Learning Objectives for each course are identified as  $\underline{B}$ eginning,  $\underline{D}$ eveloping, or  $\underline{A}$ dvanced. See Appendix 5 for detailed information and the curriculum map for each course.

#### B. Direct and Indirect Measures

Employment rates in the construction industry for students graduating in construction management at Colorado Mesa University are close to 100%. Several employers have hired multiple CM graduates indicating that the education and skill sets received from the CM program are meeting industry needs.

Students are encouraged to take the American Institute of Constructors (AIC) Level 1 Exam, to earn the Associate Constructor (AC) credential. Of the students that have taken this exam, 100% have passed. The Construction Management Industry Advisory Board (CMIAB) conducts a survey of all graduating students in Construction Management program. This survey shows students, while making suggestions for improvement, are overall satisfied with the education received by this program.

The Construction Management program works closely with the CMIAB asking for input and advice on the knowledge and skills needed by the industry from a college graduate in construction management. This information in turn is calibrated into the student learning outcomes.

C. Describe program improvements resulting from assessment of SLOs since the last program review No prior program review has been performed.

#### D. Refined student learning outcomes

The construction management program has been making a concerted effort to adapt and modify course content to facilitate the programs Student Learning Objectives defined in paragraph A. Industry accepted software has been integrated into course content to facilitate student learning and develop applied skill sets. Opportunities are given for students to give oral presentations, in the context of industry models, to present field reports, construction schedules, construction estimates and business plans. Course projects are assigned that allow student to develop deliverables to the instructor, comparable to the expectation of deliverables in the construction industry. Course assignments and projects are designed to help students generate questions which the instructor then assists students in understanding the process needed for the student to determine the answer. Students have opportunities for relevant hands on experience. Students erect a life size mock-up of structural steel, meal bar joist and metal decking. Students also obtain a 10 hour OSHA card

E. Other information /data related to learning outcomes assessment (program's option) - None

#### PART 6 - FUTURE PROGRAM PLANS

#### A. Program Vision

The vision for the construction management program at Colorado Mesa University it to continue to grow this, relatively, new program to meet the growing demand for professionals in this area. It is the belief that the potential student enrollment (supply) and the current industry need (demand) is currently not at equilibrium. The vision is to provide a construction management education that is well rounded and allows the students to gain the skills to be marketable in the industry sector of pursuit. The vision of Colorado Mesa University CM program is to be the school of preference for students to receive an education in construction management and for employers to recruit employees, drawing a diversity of students, first from the counties in western Colorado, then from the state of Colorado, and finally from other states.

#### B. Strengths and challenges facing program

Strengths that face the program are the following:

- The construction management program has great support from the Business Department, University, area general contractors, subcontractors, construction related suppliers, and local construction trade organization (Western Colorado Contractors Association and the NW Colorado Home Builders Association).
- Relationships with regional and national contractors (e.g. Lithko Contracting, Quest Civil Constructors, and Kewitt) have been forged.
- The faculty in the construction management program have a diverse knowledge of the construction industry and technology that is used in the management of projects.
- As the only CM program on the Western Slope, this program is poised and designed to meet the needs
  of both CM students and CM employers of this area.

Challenges that face the program are the following:

Articulation with construction courses taught through Western Colorado Community College
(WCCC). CONC 101 – Construction Safety and Regulations, CONC 116 Building Materials,
CONC 161 – Building Mechanical/Electrical, CONC 208 Construction Equipment and CONC
218 Surveying are the courses taught by WCCC in fulfillment of the Construction Science
requirements of the BS in construction management. The autonomy between the Construction
Technology program by WCCC and the Construction Management program presents challenges in
the above listed courses. The current relationship with that program is good and faculty are
currently working to achieving adequate articulation.

The goal is to align both the Construction Technology AAS degree and the Construction Management BS degree, so when a student chooses to continue beyond the AAS degree into construction management BS degree, the student will be able to do so with as many credits as possible being applied to the BS degree.

2. The ability to provide expertise in all of the core content areas of construction management. The current enrollment of students and required teaching load for faculty, does not justify additional faculty resources. The challenge with having only two faculty is the ability to be expert in the diversity of all required core construction courses. Currently the two faculty members teach 6-8 diverse courses in an academic year.

Two Courses: 1. CONM 361 – Advanced Building Systems (course content is mechanical, electrical, plumbing, infrastructure systems); 2. CONM 370 – Managing Safety and the Regulatory Environment, are subject areas were the construction management program needs additional expertise.

3. Adequate and appropriate space to teach courses. Teaching space in the Archuleta Engineering Center (AEC) is quickly becoming an issue. The AEC currently is home to the Mechanical Engineering, Manufacturing Technology, Construction Technology, Construction Management and the Machining Technology program for high school students. Each respective program has experienced growth in the past few years, and has required several new sections of courses to be offered in the AEC building. In the past two year the construction management program has begun teaching two new courses: 1. CONM 264 – Mechanical/Industrial Systems; 2. CONM 485 – Construction Management Issues.

The current projection is that Fall Semester 2015 will present a crisis of insufficient space in AEC to teach all planned sections for all programs listed in the above paragraph. The issue is not just space but the appropriate space. AEC 123 is a classroom equipped with 21 student computers which is a high demand teaching space by all programs housed in the AEC building. Currently there are no other classroom spaces available or known comparable to AEC 123.

Over the course of the past year AEC 114, known as the Kiosk, has been used as classroom space for both the Construction Technology and Construction Management Programs. Ideally this space should be reserved as a resource for students to work on homework assignments. Eight computers are currently available in this space, but are unavailable for student use when classes are being taught in this space. This also is the problem with AEC 123 maximized as a classroom; very little open time is available for students to have computer face time to learn and develop software skills required in all programs housed in the AEC building.

- 4. <u>Available space and technology for student use outside of class</u> Computers with specialized construction software is not adequately available for students outside of class. This is due to the high demand for teaching space in the AEC building.
- 5. Technology forcing methodology changes in Construction Management Technology is quickly changing the methodology in how construction managers perform management tasks. The challenge will be for the construction management faculty to stay current and enabled to properly prepare student with the correct knowledge and skill sets to be assets to prospective employers.

#### C. Trends in the Discipline that could affect future planning for program

The earliest construction management programs, offered as a discipline at universities, trace roots to the mid 1940's post WWII. The trend for hiring middle management positions in the construction industry has changed in recent years and continues to change. Construction companies are and continue to replace middle management positions from construction management educational programs at universities. This

trend will continue and drive up the demand for construction management students. The projection is that this will contribute to the growth of the program.

According to the Bureau of Labor Statistics Occupational Handbook, the job outlook for Construction Management is rising faster than the average job at a rate of 16%. It is expected that there will be 78,200 more jobs in this area between now and 2022 with the current job number at 485,000. According to the BLS, the entry-level education required is a Bachelor's degree. http://www.bls.gov/ooh/management/construction-managers.htm

Another trend in the construction industry is the use of technology in the procurement and delivery of construction projects to owners. Digital Information and Building Information Modeling (BIM) are examples of emerging technologies that are changing the paradigm of how projects are managed. This trend requires the construction management student to become educated in specialized computer software. Students that demonstrate to potential employers, skill sets in using specialized construction software, are at an advantage and marketable upon graduation. This creates the need to ensure that adequate computer lab/classroom software and space is made available to the construction management students.

Colorado Mesa University's Construction Management Program is a member of the Associated Schools of Construction (ASC). A strong relationship between the ASC and the construction industry has been developed. It is becoming common for many construction companies to hire from their internship programs. These companies identify potential interns through university construction management program participation in the ASC sponsored student competition and conference. As the construction management program grows so will the financial needs to help student participation.

D. How program review process is being used to improve the program's teaching and learning Review of the program, over the course of the past 18 months, has highlighted several items that need to be changed to deliver a better program to the construction management student attending Colorado Mesa University. Faculty expect to have proposed changes in the 2015-2016 academic year catalog.

The proposed changes are summarized as follows:

- 1. Modifying names to better communicate the course (e.g. Project Management is proposed to be changed to Construction Project Management);
- Modifying catalog descriptions to better communicate the expected course content;
- Modifying course prerequisites;
- 4. Adding an additional estimating class (CONC 228) to the core curriculum;
- Deleting CONM 264 Mechanical/Industrial Systems. This course has been identified as being redundant with CONC 161 – Building Mechanical/Electrical and CONM 361 – Advance Building Systems;
- Adding CONM 234 Graphic Communications for Construction Management. This course will replace CONM 264;
- 7. Create an option for students to choose between multiple CONM courses to fulfill core CM requirements. For example, the student will be able to choose between taking an internship for credit or enrolling in a course that would allow them to prepare and take a certification exam to earn a credential (e.g. the AIC level 1 exam for the AC credential or the LEED exam for the GA credential, etc.)

#### E. Recommended program's challenges and potential resources need to address them

<u>Faculty Resources</u> – Professional development will be required for faculty stay current with the issues and trends in the construction industry. As the program continues to grow, additional course sections will need to be added. Added course sections will ultimately require additional faculty resources in the construction management program.

<u>Space Resources</u> — with the limited shared space in the Archuleta Engineering Center (AEC) alternative available space outside of the AEC building will need to be found to deliver courses. AEC 114 (Kiosk) is currently being used as classroom space, but has proven inadequate to teach CONM 361 — Advanced Building Systems and CONM 401 — Financial Management in its rudimentary state.

<u>Technology Resources</u> – Specialized construction software is available, however access to computer hardware has become limited in the AEC building. It is recommended that computer lab space that can be accessed by students to complete homework assignment and projects be made available.

The potential for growth in the program and the graduate placement is high. Construction Management at CMU has much potential to yet realize.

# Appendix 1

**Course Information** 

# CSCI 375 Object Oriented Programming (3)

Advanced programming techniques using the object-oriented paradigm, with emphasis on abstractness of design, encapsulation, inheritance, and polymorphism. Additional topics include design tools and methodologies for determining classes, responsibilities, collaborations, and hierarchies. Prerequisites: CSCI 250.

CSCI 380 Operations Research (3) Methods of linear and dynamic programming, inventory and replacement models, queuing theory, game theory, PERT, CPM, and simulation. Prerequisites: MATH 152, STAT 200, CSCI 111.

#### CSCI 393 Internship (1-3)

The internship course provides the student with the opportunity to apply classroom theory to onthe-job experiences. During the internship course, the student will work at approved professional positions related to the computer science field. The student will be required to write and fulfill course objectives with the approval of the internship coordinator. Prerequisites: Junior standing, written consent of internship coordinator.

#### CSCI 395 Independent Study (1-3)

#### CSCI 396 Topics (1-3)

CSCI 445 Computer Graphics (3) Introduction to the use of the computer to produce images: two and three dimensional graphics, algorithms and data structures for hidden lines and surfaces, shading, and reflections.

Prerequisites: MATH 152 and CSCI 250.

CSCI 450 Compiler Structure (3)
Structures and techniques used in compiler writing are discussed with emphasis on scanners, symbol tables, parsers and code generation. The front end of a recursive descent parser is written for the semester project. Error analysis and code optimization are discussed as time permits.
Prerequisites: CSCI 321.
Corequisite: CSCI 330.

CSCI 460 Database Design (3)
Design and implementation of relational databases. Approaches and methods

of design and normalization, SQL, integrity, and security will be discussed. Prerequisite: CSCI 250.

CSCI 470 Operating Systems Design (3) Aspects of computer operating system design and implementation including memory management, processor management, device management, information management and performance evaluation methods. Some knowledge of C is required. Prerequisite: CSCI 250, 241.

CSCI 480 Theory of Algorithms (3) Techniques for analyzing time and space requirements of computer algorithms. Models are set up for analysis and techniques are applied to algorithms related to sorting and searching, pattern-matching, graph problems and other selected problems. The notion of NP-hard problems is introduced and related problems are discussed. Prerequisites: MATH 152, CSCI 250.

CSCI 482 Theory of Computation (3) Computability and automata theory introduced. Regular expressions, finite and pushdown automata, Turing machines, grammars and their relationship to automata, Church-

Turing hypothesis, incomputable and undecidable functions and equivalence of computability models are covered. Prerequisites: MATH 369, CSCI 250.

CSCI 484 Computer Networks (3) Topics include: hardware technology for local and long haul networks, circuit

and packet switching, interface between computer and network hardware, network architectures and protocols, routing, congestion and flow problems, queuing theory, and reliability issues.

Instructors may choose to implement a sample network in which case the contents may be particularized to that network. Prerequisite: STAT 200.

CSCI 486 Artificial Intelligence (3) Introduction to artificial intelligence programming with study of topics such as knowledge representation, expert systems, solution space search, non- deterministic algorithms (neural nets, genetic algorithms), etc. Programs will be written in a selected

#### Al programming

language such as Lisp or Prolog. Prerequisite: CSCI 250.

CSCI 490 Software Engineering (3) Exploration of the philosophy of software engineering. Software project planning, requirement analysis, software system design and strategies, software design tools, program and system testing, system maintenance, and economics are examined. Prerequisites: CSCI 250 and CSCI 330.

CSCI 494 Seminar (1-3)

Discussions of specialized topics by students, faculty, or visiting professors. One or two one-hour meetings per week.

CSCI 495 Independent Study (1-3)

CSCI 496 Topics (1-3)

# CONSTRUCTION MANAGEMENT (CONM)

CONM 181 Principles of Construction Management (3)

Construction industry practice emphasizing business organization and management techniques. Includes principles of management, organizational environments, decision- making, design, technology, leadership, and basic construction management with terminology, estimating and scheduling. This course replaces MANG 201 requirements for Construction Management majors only. It does not substitute for MANG 201 in any other way. Prerequisite: CONC 101.

#### CONM 264 Mechanical/Industrial Systems (3)

Analysis and design understanding of specialty mechanical and industrial processes. Includes fundamentals of thermodynamics, fluids, control interface issues, system testing and commissioning. Emphasis on fundamental theory followed by proof of concepts through practicum. Lecture, lab and field

exercises. Prerequisites: MATH 113, CONC 101, and CONM 181.

# CONM 316 Construction Materials and Methods (3)

Materials and methods utilized in design and construction of vertical and horizontal projects. Course addresses

Certain courses are only offered during the fall or spring semesters, or may be available only in alternating years. It is the student's responsibility to meet with their advisor and/or check the two-year course planning calendar on the Colorado Mesa University website for course availability. Learn more at **coloradomesa.edu/academics**.

status.

proper construction methods and governing trade association standards. Sustainability and ethics relating to specification, ordering, and installation of construction materials incorporated.

Prerequisites: CONC 104, CONC 208, and CONC 251.

CONM 340 Construction Estimating
(3) Application of industry-recognized methods of construction estimating to compile conceptual systems and detailed estimates. Emphasis on students' ability to communicate estimate results in written and oral presentations. Prerequisites: CADT 105, CONC 208, CONC 228, CONC 264, and CONM 316.

#### CONM 361 Advanced Building Systems (3)

Electrical, heating, ventilation, air conditioning, plumbing, and fire suppression. Emphasis on design, operation, and interaction. Principles of codes, design, methods and materials as applicable to the construction industry included. Building system controls for smart buildings integrated in each component. Prerequisite: CONC 161.

#### CONM 362 Structure Analysis -Statics/ Materials Strength (3)

Behavior of structural components and systems plus a broad overview of structural engineering analysis/design process. Principles of statics and strength of materials including properties of materials, forces, equilibrium, stresses and strains studied. Emphasis on understanding behavior of structural components associated with construction processes. Prerequisites: STAT 200, MATH 141, PHYS 112, and PHYS 112L.

#### CONM 370 Managing Safety and the Regulatory Environment (3)

Impact of safety on the construction industry, in-depth discussions concerning application of O.S.H.A. Safety and Health Standards for the Construction Industry. Course emphasis on safety management training for jobsite supervisory personnel. Additionally, various regulatory requirements encountered in construction addressed. Prerequisite: Junior

CONM 401 Construction Financial
Management (3) Contract
methods for recognizing revenue
and its impact on financial
statements. Analysis of financial
statements and their use in developing
budgets, projecting cash needs, pricing
construction projects and forecasting
impact of business decisions on profit
addressed. Prerequisite: FINA 301.

#### CONM 462 Soil and Foundation

Construction (3) Properties of subsurface materials and principles of subsurface construction. Topics include soil classification and testing, soil mechanics, earthmoving operations and foundation systems from a contractor's perspective. Techniques of subsurface investigations and subsequent interpretation of soil reports studied to understand foundation construction methods and related field problems. Prerequisite: CONM 362.

CONM 472 Planning and Scheduling (3) Planning, scheduling and controlling construction operations. Emphasis on the planning phase of construction projects, logic diagrams, networkbased scheduling techniques, and computer-assisted scheduling. Application of industry-recognized scheduling methodology to construction projects. Emphasis on communicating project schedules in written and oral presentations. Prerequisite: CONM 264 and CONC 265.

CONM 480 Project Management (3)
Exploration of professional practice as a constructor requiring understanding of working and contractual relationships among all participants in any project process. Required participation in construction simulation involving initial planning to project completion (includes budgets, estimating, scheduling, financing and creating contracts, and other construction forms as necessary). Prerequisites: CONM 264, CONM 340 and CONM 401.

## CONM 485 Construction Management Issues (3)

Issues facing the professional constructor. Integration of project management includes field study, research, case readings, problem solving, and project

deliverables. Prerequisites: BUGB 349, CONM 340, CONM 401, CONM 472, CONM 480, senior status, and permission of instructor.

CONM 496 Topics: (1-3)

CONM 499 Construction Internship (1-6)

University/construction industry partnership to provide real-life working experiences. The internship program's primary purpose is to prepare the construction management student with leadership responsibilities in a technologically oriented, diverse, dynamic and global construction environment. Prerequisites: Senior status and consent of instructor.

#### CONSTRUCTION TECHNOLOGY (CONC)

CONC 100 Introduction to the Trades (1)

Introduction to construction work for all crafts. Reviews history of the trade, describes apprentice programs, identifies career opportunities for construction workers, and addresses the attributes and characteristics workers should possess.

CONC 101 Construction Safety and Regulations (3)

Construction safety and its effect on productivity and employee morale.

Application of basic principles of accident prevention. Complying with the various federal, state, and local laws governing safety (OSHA), hazardous chemicals,

and drugs in the work place.

CONC 102 Electrical Safety (1)
Introduction to safety rules and regulations for trainees entering the construction trades. Necessary precautions for various electrical hazards found on the job. OSHA mandated lock/ tag out procedures.

CONC 103 Rigging Safety Basic (1) Introduction to the safe use of slings, hardware, hoists, and hitches used in rigging operations. Also highlights critical safety issues and accepted rigging techniques and practices.

CONC 104 Architectural/Civil Print Reading (2)

Reading and hand-drafting prints as used in industry, application of that

<sup>√</sup> This course is approved by the Colorado Department of Higher Education for statewide guaranteed transfer as part of the gtPathways program. For more information please see page 53.

information to various architectural and civil industries.

CONC 116 Building Materials (3) Introduction to building materials and methods commonly used today. Includes interior and exterior materials from foundations to roof systems.

CONC 117 Building Materials Testing (3) Introduction to the properties and testing of materials used in today's construction projects. This includes wood products, metal, soil, aggregates, concrete, and asphalt. Prerequisites: CONC 116 or Instructor permission.

#### CONC 120 General Construction Framing (2)

Basic framing methods and materials utilizing a hands-on framing lab. The basics of wood and metal framing. Other methods of construction such as Masonry, EIFS, and Stucco construction also covered.

CONC 121 Floor Framing (2) Cover framing basics as well as the procedures for laying out and constructing a wood floor using common lumber as well as

engineered building materials. Prerequisite: Instructor permission.

CONC 122 Wall and Ceiling Framing (2) Focus on the procedures for laying out and framing walls and ceilings, including roughing-in door and window openings, construction corners and partition T's, bracing walls and ceilings, and applying sheathing. Prerequisite: Instructor permission.

#### CONC 125 Roof Framing Materials and Methods (2)

Introduction to the application techniques and estimation of asphalt and wood roofing products and accessories including gutters and

Prerequisite: Instructor permission.

CONC 130 Windows & Exterior Doors (2) Identification of various types of windows, skylights, and exterior doors. Provides instructions for installation.

Instruction for installing weatherstripping and locksets. Prerequisite: Instructor permission.

#### CONC 131 Exterior Trim (1) Cornice and rake construction,

corners, windows, and door trim. Installation of soffits, fascia and similar trim items and the estimating and selection of proper materials. Prerequisite: Instructor permission.

CONC 140 Stair Construction/Layout (2) Wooden stairs used in residential and commercial construction and procedures for laying out stairs, cutting out stringers and installing and finishing stairs.

Prerequisite: Instructor permission.

#### CONC 147 General Interior Finishes/ Trim (2)

An overview of interior finishes including general painting and wall coverings.

Installation and finishing of drywall and suspended ceilings. Material choices and installation techniques of various interior trim, including doors, baseboard, and casement. Prerequisite: Instructor permission.

#### CONC 161 Building Mechanical/ Electrical (3)

Introduction to basic electrical. plumbing, heating, ventilation, and air conditioning systems found in residential and commercial building. Basic theory and design concepts included. Prerequisite: Instructor permission.

#### CONC 196 Topics (1-3)

#### CONC 201 Building Permits, Codes, Ethics (1)

Introduction to the basic concepts of code enforcement and governmental regulations concerning building and the process through which these regulations are enforced. Also aspects of the trade and how to assure an ethical approach when dealing with owners/customers, contractors, and suppliers in meeting industry-building standards.

#### CONC 202 Introduction to Concrete Materials (1)

Describes the properties, characteristics, and uses of various types of cement, aggregates, and other materials that, when mixed together, form different types of concrete. Procedures for concrete volume estimates and testing of freshly mixed concrete are covered.

#### CONC 203 Concrete Placing & Finishing (2)

Tools, equipment, and procedures required for handling, placement, and finishing of concrete at the job site. Safety procedures for handling, placing, and finishing concrete are emphasized. Prerequisite: Instructor permission.

#### **CONC 205** Job Site Layout & Measuring

(2)

Job-site layout as outlined on a set of blueprints for a given construction site. Includes complex plot plans and multi- unit site layouts. Prerequisite: Instructor permission.

CONC 208 Construction Equipment (3) Basic understanding of general equipment and methods employed in different sectors of the construction industry. Areas covered are factors affecting the selection of equipment, rental versus ownership of equipment, estimating earthwork quantities, figuring equipment production, equipment management, and quality control of projects.

#### CONC 215 Form and Foundation Systems (2)

Construction of forms for continuous, stepped continuous, pier, and concrete foundations. Also covered are edge forms used for on-grade concrete slabs and similar structures. Forming terms, parts of forms, and the procedures for construction of basic footing and edge forms are included. Prerequisite: Instructor permission.

#### CONC 218 Surveying (3)

The fundamentals of modern plane surveying techniques and basic surveying instruments. Emphasis on construction-related aspects of surveying and the development of skills in using surveying field information. Prerequisites: UTEC 107 or MATH 113

#### CONC 228 Estimating and Cost Control (3)

The estimation process, the role of the estimator, types of estimation, CSI Divisions, bid/contract documents, change order pricing, value engineering, design build projects, and estimate compilation and cost

controls.

Prerequisites: CADT 105, CONC

116,

Certain courses are only offered during the fall or spring semesters, or may be available only in alternating years. It is the student's responsibility to meet with their advisor and/or check the two-year course planning calendar on the Colorado Mesa University website for course availability. Learn more at **coloradomesa.edu/academics**.

CONC 161, CONC 208 or instructor permission.

# CONC 234 Commercial/Industrial Plans (2)

Introduction to the commercial/industrial construction industry. Processes, practices, and materials typically used in commercial/industrial construction will be studied.

#### CONC 235 Thermal and Moisture Methods and Materials (1)

Selection and installation of various types of insulating materials in walls, floors, and attics. Covers the uses and installation practices for vapor barriers and waterproofing materials.

CONC 245 Project Management (3)
Principles of project planning,
scheduling, estimation and
management. Emphasis on the
basic skills required to supervise
personnel including oral
communication, problem
identification, problem solving and
decision-making. The course will also
cover how to control productivity on

#### CONC 251 Construction Prep: Codes, Permits (3)

the project. Prerequisites: CONC

228 or instructor permission.

Legal aspects including liens, contracts, bids, specifications, building permits and licensing, inspections and the Uniform Building Code. Introduces intra-trade coordination, remodeling and additions, construction practices, construction management and supervision.

CONC 253 Cabinets & Countertops (3) Selection, installation, and terminology of factory built cabinets and countertops. Includes various types and design, and examines estimation of cost of cabinets and installation. Prerequisites: instructor permission.

#### CONC 265 Planning and Scheduling for the Construction Supervisor (3)

Planning the sequence, duration and relationship of activities for a construction process. Communicate the plan to contractual parties and to use the plan as reference point for examining project changes. Includes planning for safety, organization, manpower,

problem solving, and site layout. Prerequisites: instructor permission.

CONC 270 Practical Applications (4)
Supplemental coursework with practical work experience related to educational program. Students will work under the immediate supervision of experienced personnel at the business location. Students will work on construction sites or projects related to their career field of interest with advice of faculty. Prerequisite: instructor permission.

CONC 296 Topics (1-3)

# CRIMINAL JUSTICE (CRMJ)

# CRMJ 201 Introduction to Criminal Justice (3)

Philosophy, history and development of the American criminal justice system. Survey of the role of law enforcement agencies, the courts, jails, prisons, probation and parole in both juvenile and adult systems.

#### CRMJ 296 Topics (1-3)

CRMJ 301 Criminal Procedure (3)
Analysis of landmark U.S. Supreme
Court cases and their impact on
operating procedures of law
enforcement and the courts. Focuses on
Fourth, Fifth, and Sixth Amendments to
the U.S. Constitution.
Prerequisites: CRMJ 201 or POLS 101
or consent of instructor.

CRMJ 302 Ethics in Criminal Justice (3) Examination of ethics in the criminal justice system from investigation, arrest, prosecution, defense, and corrections. Prerequisite: CRMJ 201.

CRMJ 310 The Police Process (3)
Basic features of policing in the United States. Police work, police organizations, police officers, and the critical problems facing policing today are examined in social and political context. Prerequisite: CRMJ 201.

#### CRMJ 311 Victimology (3)

Study of crime victims, their numbers, common characteristics, and roles they play in their own victimization. Legal, psychological, and social perspectives explored. Various theoretical explanations regarding both first-time and repeat victimizations discussed. Prerequisite: CRMJ 201.

#### CRMJ 315 Research Methods in Criminal Justice (3)

Research methods and their application to Criminal Justice. Prerequisite: CRMJ 201, and STAT 200 or STAT 215.

CRMJ 320 Corrections (3)
The role of corrections in the criminal justice system:
history, guiding philosophies and theories, treatment approaches, custody issues, and supervision of offenders on probation and parole.
Prerequisite: CRMJ 201 or consent of instructor.

#### CRMJ 321 Forensic Science for Criminal Justice (3)

Advanced overview of current issues, techniques, practices, and investigative strategies related to criminal forensics.

Specific skills used in crime scene processing and analysis, medico-legal examination, and courtroom testimony developed. Prerequisite: CRMJ 201.

CRMJ 325 Juvenile Justice (3)
Philosophy, history, and current state of juvenile justice and law with emphasis on juvenile trends, juvenile policing, juvenile court, and juvenile post conviction strategies.
Prerequisite: CRMJ 201.

CRMJ 328 American Court Systems (3) The American court system; local, state, and national, including consideration of the impact of prosecutors, defense personnel, judges, and other factors on court decisions and the criminal justice system. Prerequisites: CRMJ 201 or POLS 101.

CRMJ 330 Domestic Violence (3) Exploration of intimate and domestic violence through a life-course perspective. Child abuse and neglect, intimate partner violence, and elder abuse and neglect considered. Criminal justice responses and prevention efforts critically examined. Prerequisite: CRMJ 201.

**CRMJ 340 Community Corrections** (3) Applied and practical approach to community corrections. Assessment, supervision, reintegration, and community partnerships emphasized. Special needs populations, unique issues and challenges, and insights into day-to- day experiences of various community

<sup>√</sup> This course is approved by the Colorado Department of Higher Education for statewide guaranteed transfer as part of the gtPathways program. For more information please see page 53.

Name: Phone:		Email:			CSUID:
Pnone:		Construction Management Majo	r Requirements Effective Fall 2012		Date:
Course P	rerequi	sites			
Semester	Credit	S Course	Prerequisites	AUCC	Note
	1	MATH 117 College Algebra in Context I	Math Placement Exam	1B	Note
	1	MATH 118 College Algebra in Context II	MATH 117	1B	
Tinat Van					
First Year					
Semester	Credit		Prerequisites	AUCC	
	Pre-CM	Requirements- Must be completed prior to application for a	dmission to CM program, also need 2.75 cu	umulativ	e CSU GPA to apply
	1	MATH 125 Numerical Trigonometry	MATH 118	1B	Must earn a C or better
		The same of the sa	CO 130 or SAT score of 600 or ACT		Must seen a B or half-
	3	CO 150 College Composition	score of 26 or Challenge Exam	1A	Must earn a B or better
	3	CON 101 Introduction to Construction Management			Must earn a B or better
	Т з	GEOL 120 or GEOL 122 or GEOL 124 Physical Geology		T 04	
	1	GEOL121 Introductory Geology Laboratory	<del></del>	3A	Choose one of the three
	3	ECON 202 Principles of Microeconomics	MATU 117 or higher level meth severe	3A	
	3	Arts and Humanities	MATH 117 or higher level math course	3C	0 0 11
	3	Arts and Humanities		3B	See Catalog
	3	Historical Perspectives	<del></del>	3B	See Catalog
	3	Global and Cultural Awareness		3D	See Catalog
-	2	CON 131 Graphic Communications/CAD		3E	See Catalog
S	3	CON 151 Construction Materials and Methods		1	
Total:	31	CON 151 Construction Materials and Methods			
TOTAL.	] 31				
econd Y	ear				
emester	Credits	Course	Prerequisites	AUCC	Note
	3	MATH 141 Calculus in Management Sciences	MATH 118		Note
	3	SPCM 200 Public Speaking*	WATHTIO	1B	
	3	ACT 205 Fundamentals of Accounting	201 prodite	-	
	3	BUS 205 Legal and Ethical Issues in Business	30+ credits		L
	5	PH 121 General Physics I	30+ credits	T	
	2	CON 251 Materials Testing and Processing	Corequisite: MATH 125	3A	
	1 2	CON 251 Materials Testing and Processing	CON151, CM Admission		
		CON OCA Construction Construction	MATH 125 or MATH 160 and CON 131		
	3	CON 261 Construction Surveying	or INTD 166		
	3	CON 265 Construction Estimating I	CON 151		32
	2	CON 317 Safety Management			Prerequisite for CON487 A or B
	2	CON 351 Construction Field Management	Corequisites: CON 251 and CON 317		
Total:	29				
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hird Year emester  Total:	Credits 3 1 4 3 3 3 3 3 29 3 6 Credits 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	COURSE STAT 204 Statistics for Business Students  CON 267 Pre-Internship CON 359 Structures I CON 365 Construction Estimating II CON 366 Construction Equipment and Methods  CON 367 Construction Contracts and Project Administration  CON 371 Mechanical and Plumbing Systems  Advanced Writing MGT 305 Fundamentals of Management  CON 487 B 12 Week Internship OR CON 487 A 24 Week Internship (3 credits will fulfill Technical elective)  CON 459 Structures II CON 461 Construction Project Scheduling and Cost Control CON 462 Financial Management for Construction  CON 465 Const. Mgmt. Professional Practice MGT 473 Employment Relations: Labor and Management Technical Electives	Prerequisites  MATH 125 and Junior or Senior Standing  CON 265  CON 265  CON 265  CON 265  COR 265  Corequisite: CON 265  Corequisite: CON 351  Corequisite for CM majors: CON 360  Corequisite for ID majors: INTD 276  CO150 or HONR 193  60+ credits  500 Hours Documented Work Experience CON 267, CON 367 & CON 317  Prerequisites  CON 359 or CIVE 359  COR 359  Corequisite: CON 365  ACT 205 or 210 and MGT 305 or 320  Prerequisite: CON 487 A or B  Corequisite: CON 461	AUCC 4A 4C	Note  Take immediately prior to CON 487A or B; if opting 12 week internship, 500 hours should be submitted before registration  Prerequisite for CON487 A or B  See Catalog  *3 of 6 credits from 487A can be applied to required Technical Elective
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hird Year emester  Total:	Credits 3 1 4 3 3 3 3 3 29 3 6 r Credits 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	COURSE STAT 204 Statistics for Business Students  CON 267 Pre-Internship CON 359 Structures I CON 365 Construction Estimating II CON 366 Construction Equipment and Methods  CON 367 Construction Contracts and Project Administration  CON 371 Mechanical and Plumbing Systems  Advanced Writing MGT 305 Fundamentals of Management  CON 487 B 12 Week Internship OR CON 487 A 24 Week Internship (3 credits will fulfill Technical elective)  CON 459 Structures II CON 461 Construction Project Scheduling and Cost Control CON 462 Financial Management for Construction  CON 465 Const. Mgmt. Professional Practice MGT 473 Employment Relations: Labor and Management Technical Electives	Prerequisites  MATH 125 and Junior or Senior Standing  CON 265  CON 265  CON 265  CON 265  COR 265  Corequisite: CON 265  Corequisite: CON 351  Corequisite for CM majors: CON 360  Corequisite for ID majors: INTD 276  CO150 or HONR 193  60+ credits  500 Hours Documented Work Experience CON 267, CON 367 & CON 317  Prerequisites  CON 359 or CIVE 359  COR 359  Corequisite: CON 365  ACT 205 or 210 and MGT 305 or 320  Prerequisite: CON 487 A or B  Corequisite: CON 461	AUCC 4A 4C	Note  Take immediately prior to CON 487A or B; if opting 12 week internship, 500 hours should be submitted before registration  Prerequisite for CON487 A or B  See Catalog  *3 of 6 credits from 487A can be applied to required Technical Elective  Note  See approved list

Total Credits Required for CM Program and CSU Degree Completion: 120 minimum

PREREQUISITE = Must be completed with a passing grade prior to

COREQUISITE: Can be taken concurrently All CON prefix courses are restricted until admission to the Construction Management Porgram

#### **CONSTRUCTION ELECTIVES**

CON Courses not required by CM major (fulfills CON or Technical Elective) (F= Fall, S=Spring)

CON270 Intro to Road Construction (3) F

CON352 Metal Fabrication for Construction (2) F,S

CON370 Asphalt Pavement Materials and Construction (3) F.S.

CON384 Supervised College Teaching (1-2) F,S

CON450/INTD450 Travel Abroad- Sustainable Building (3)

(Summer or Winter Break Only)

CON464 Construction Leadership (application required) (3) S

CON476 Sustainable Design and Construction (3) F

CON477 Residential Aging-in-Place and Green Building (3) S

CON471 Project Management for Mechanical Systems (3) F

CON568 Construction Industry Institute Best Practices (3) F

Group Studies offered as CON496

500 level CON graduate course s (instructor approval required)

#### **TECHNICAL ELECTIVES**

**Business/Computer Science/Economics:** 

**BUS150** CS110 ECON304 CS150 FIN305

ECON346

ECON306 ECON204 ECON315 REL360 MKT305 ECON240 ECON320

#### Foreign Language:

Any "speaking" course

#### interior pesign:

200 level or higher (check for course prerequisites)

#### Math/Statistics:

STAT301 or higher

Science:

CHEM 103/104 CHEM 113/114

CHEM 107/108

**HES240** 

CHEM 111/112 PH142

#### Civil Engineering:

300 level or higher

Communication:

CO401

JTC411

JTC301

Additional CON487A (24 week Internship) credits accepted

#### All other courses must be approved by the CM Advisor

- . Must enhance student's knowledge or skill in the Construction Management field
- · Technical Elective Credits earned DO NOT count for other CM Major requirements
- Must be beyond introductory level coursework
- · See your advisor to determine the total number of Technical Elective Credits needed

#### ALL-UNIVERSITY CORE CURRICULUM(AUCC)

\*\* A student must earn a cumulative grade point average of 2.000 or better in the courses used to satisfy categories 1 through 3 of the All-University Core Curriculum requirements. \*\*The composition and mathematics requirements must be

completed within the first 60 credits (CSU and transfer) taken.

B.	Arts/Hu	manitie	es. (6 credits) choose 2
	ART	100	Introduction to the Visual Arts
	D	110	Understanding Dance
	E	140	The Study of Literature
	F	232	Introduction to Humanities
	E	242	Reading Shakespeare
	F	270	Introduction to American Literature
	F	276	Survey of British Literature I
	F	277	Survey of British Literature II
	ETST	240	Native American Cultural Expressions
	LARA	200	Second Year Arabic I
	LARA	201	Second Year Arabic II
	LARA	250	Arabic Language, Literature, and
	- Table 1		Culture in Translation
	LCHI	200	Second Year Chinese I
	LCHI	201	Second Year Chinese II
	LCHI	250	Chinese Language, Literature, and
	75.00		Culture in Translation
	LFRE	200	Second Year French I
	LFRE	201	Second Year French II
	LFRE	250	French Language, Literature, and
			Culture in Translation
	ICED	200	Second Year German I
	LGER	201	Second Year German II
	LOED	250	German Language, Literature, and
			Culture in Translation
	LIDN	200	Second Year Japanese I
	LJBN	201	Second Year Japanese II
	LJPN	250	Japanese Language, Literature, and
			Culture in Translation
	LRUS	200	Second Year Russian I
	<b>LRUS</b>	201	Second Year Russian II
	LRUS	250	Russian Language, Literature, and
			Culture in Translation
	LSPA	200	Second Year Spanish I
	LSPA	201	Second Year Spanish II
	LSPA	250	Spanish Language, Literature, and
			Culture in Translation
	MU	100	Music Appreciation
	MU	111	Music Theory Fundamentals
	MU	131	Introduction to Music History and
			Literature
	PHIL	100	Appreciation of Philosophy
	PHIL	103	Moral and Social Problems
	PHIL	110	Logic and Critical Thinking
	PHIL	120	History and Philosophy of Scientific
	121201200	Paralist.	Thought
	SPCM	100	Communication and Popular Culture
	SPCM	201	Rhetoric in Western Thought
	TH	141	Introduction to Theatre

D	. Historic	cal Pers	pectives.(3 credits)
	AMST	100	Self/Community in American Culture,
			1600-1877
	AMST	101	Self/Community in American Culture Since 1877
	ANTH	140	Introduction to Prehistory
	ETST	250	African American History
	ETST	252	Asian American History
	ETST	255 100	Native American History
	HIST		Western Civilization, Pre-Modern
	HIST	101 115	Western Civilization, Modern Islamic World to 1500
	HIST		
	HIST	120 121	Asian Civilizations I Asian Civilizations II
	HIST		
	HIST	150	U.S. History to 1876
	HIST	151	U.S. History Since 1876
	HIST	170	World History, Ancient-1500
	HIST	171	World History, 1500-Present
	HIST	250	African American History
	HIST	252	Asian American History
	HIST	255	Native American History
	NR	320	Natural Resources History and Policy
E.			tural Awareness.(3 credits)
	<b>AGRI</b>	116	Plants and Civilization
	<b>AGRI</b>	270	World Interdependence-Population and Foo
	AM	250	Clothing, Adornment, and Human Behavior
	ANTH	200	Cultures and the Global System
	E	238	20th Century Fiction
	E	245	World Drama
	ECON	211	Gender in the Economy
	ETST	100	Introduction to Ethnic Studies
	ETST	205	Ethnicity and the Media
	ETST	253	Chicana/o History and Culture
	ETST	256	Border Crossings: People/Politics/Culture
	HORT	171	Environmental Issues in Agriculture
	ΙE	116	Plants and Civilizations
	IE	270	World Interdependence-Population & Food
	IE	370	Model United Nations
	LB	170	World Literatures to 1500
	LB	171	World Literatures-The Modern Period
	PHIL	170	World Philosophies
	POLS	131	Current World Problems
	POLS	232	International Relations
	POLS	241	Comparative Government and Politics
	SA	482	Study Abroad
	SOC	205	Contemporary Race-Ethnic Relations
	SOCR	171	Environmental Issues in Agriculture
C	ategory	2. Adva	nced Writing (3 credits)
100	co	300	Writing Arguments
	CO	301A	Writing in the Disciplines-Arts/Hum H
	CO	301B	Writing in the Disciplines-Sciences
	CO	301C	Writing in the Disciplines-Social Sci
	CO	301D	Writing in the Disciplines-Education
	_		

CO

JTC

302

300

300

Writing Online

Professional/Technical Communication

Specialized Professional Writing

#### Sophomore - Fall

Course	s	Titles Credits
CET	202	Statics3
CET	207	Construction Materials & Methods 3
CET	226	Engineering Problem Solving2
<b>MATH</b>	126	Calculus & Analytic Geometry I5
PHYS	201/L	Principles of Physics I/Lab4

TOTAL 17

#### Sophomore - Spring

Credits
of Materials4
and Asphalt Materials3
s3
tion II3
Science 3
TOTAL 16
i

#### Junior - Fall

Courses		Titles	Credits
CET	305	Heavy/Highway Cost Estimating	3
CET	316	Structural Analysis	3
CET	317	Hydraulics	3
CHEM	111/L	Principles of Chemistry/Lab	4
SPCOM	103	Speaking and Listening	3
		TOTA	AL 16

#### Junior - Spring

Courses	3	Titles	Cred	dits
CET	315	Soil Mechanics Technology		3
CET	372	Traffic Analysis and Control		3
CET	412	Hydrology		3
General	Educat	ion: Humanities		
General	Educat	ion: Social Science		3
		T	OTAL	15

#### Senior - Fall

Course	s	Titles	Credits
CET	405	Reinforced Concrete Design	3
CET	415	Water & Sewer System Design.	3
CET	455	Senior Project Seminar	1
CET	473	Highway Design	3
CET Ele	ective		3
Genera	I Educati	on: History	3

TOTAL 16

#### Senior - Spring

Course	s	Titles	Cre	dits
CET	404	Structural Steel Design		3
CET	456	Senior Project		
Technic	cal Electi	ve		
			TOTAL	12
Total r	equired	credit hours		124

# CONSTRUCTION MANAGEMENT PROGRAM

Program Coordinator: Michael A. Mincic

Faculty: Kalevela, Mincic, Trujillo

The major in construction management leads to the Bachelor of Science (BS) degree in Construction Management. Graduates of the Construction Management program enter 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 managers, 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.

#### **Student Learning Outcomes**

Students who successfully complete the CM program are expected to have the ability to:

- Apply knowledge, techniques, skills, and tools of the construction industry in construction activities;
- Select and apply knowledge of mathematics, science, and technology to construction problems;
- Perform standard tests, organize and interpret test data, and apply test results to improve construction processes;
- Function effectively as members or leaders on construction teams;

- Communicate effectively regarding subjects related to construction activities; and
- Demonstrate an understanding of professional and ethical responsibilities.

#### **Construction Management Curriculum**

The CM curriculum consists of courses listed under the major categories listed below.

#### **Skills Component**

Courses		Titles	Credits	
ENG	101	Composition I	3	3
ENG	102	Composition II	3	3
			TOTAL 6	-

#### **Knowledge Component**

Courses		Titles	Cre	dits
SPCOM	103	Speaking and Listening		3
General E	Educati	on: History		3
General E	Education	on: Humanities		6
Social Sc	iences	(6 hours listed under Business**	·)	
		T	OTAL	12

#### **Math and Sciences**

Courses		Titles	Cred	dits
MAIH	121	College Algebra		4
MATH	156	Introduction to Statistics		3
CHEM	111/L	Principles of Chemistry/Lab OR		
<b>GEOL</b>	101/L	Earth Science/Lab		4
PHYS	201/L	Principles of Physics/Lab		4
		TC	OTAL	15

#### **Business and Management**

Courses		Titles Cred	lits
<b>ACCTG</b>	201	Principles of Financial Accounting	3
BUSAD	270	Business Communications	3
BUSAD	302	Ethics in Business	3
<b>ECON</b>	201**	Principles of Macroeconomics	3
<b>ECON</b>	202**	Principles of Microeconomics	3
MGMT	201	Principles of Management	3

TOTAL 18

#### Introduction to Computers

Courses		Titles Cred	its
CIS	100	Introduction to Word and Windows	. 1
CIS	103	PowerPoint & Web Publishing	. 1
CIS	104	Excel Spreadsheets	
		TOTAL	3

#### **Major Courses**

Courses		Titles	Credits
CET	102	Surveying I	3
CET	103	Surveying II	3
CET	115	Civil Drafting I	3
CET	207	Construction Materials & Method	s3
CET	208	Concrete and Asphalt Materials	3
CET	303	Construction Management	3
CET	304	Building Cost Estimating	3
CET	305	Heavy/Highway Cost Estimating.	3
CM	101	Intro to Construction Managemer	nt2
CM	231	Statics and Structures	4
CM	320	Soils in Construction	3
CM	330	Wood Structural Systems	3
CM	341	Concrete and Steel Structures	4
CM	351	Construction Planning & Schedul	ing 3
CM	445	Construction Safety	2
CM	451	Mechanical & Electrical Systems	4
CM	461	Construction Law	3
CM	465	Construction Accounting & Finan-	ce3
CM	475	Senior Project	

TOTAL 58

#### **Technical and Management Electives**

Select from ACCTG, BUSAD, CET, CM, EN, FIN,	
MGMT or MKTG	5

#### **Upper Division Technical and Management Electives**

Select from ACCTG, BUSAD, CET, CM, EN, FIN,
MGMT or MKTG3

#### Total required credit hours......120

#### **Graduation Requirements**

#### Construction Management Program Requirements

- Students are required to complete an approved program of study with a cumulative GPA of 2.000 or better in the CM major courses.
- Students are required to demonstrate skills and knowledge in the areas of quantitative analysis and science by having a cumulative GPA of 2.000 or better in the required mathematics and physical science courses.

<sup>\*\*</sup> ECON 201 and 202 are also counting for the Social Science General Education Requirement.

 Construction management majors are expected to demonstrate the ability to solve problems pertinent to the construction industry by completing a senior-year capstone activity that requires a packaged submittal and an oral presentation.

#### Institutional and General Education Requirements

To complete the General Education requirements, students are required to take a total of 35 credit hours consisting of the skills and knowledge components as specified under the undergraduate *General Education Requirements* section of this catalog. Construction Management (CM) students will take 17 of the 35 credit hours of the general education requirements under the required math and physical science courses and the required business and management component.

Therefore, the CM majors are expected to take 18 credit hours to complete the remaining skills and knowledge components in Written Communication (6 credit hours), Humanities and Speech Communication (9 credit hours), and history (3 credit hours). Please refer to the undergraduate *General Education Requirements* section of this catalog for the list of courses that can be taken to fulfill the skills and knowledge components.

#### **Outcomes Assessment Activities**

- To be eligible for graduation, all construction management majors are required to take an exit examination. The results of the exit examination are used in the evaluation of the program but have no effect on the student's GPA.
- Graduates and their employers are surveyed on program satisfaction and job performance following their graduation.
- The CM Advisory Committee meets every year to review the three year cycle report and make suggestions for program improvement. The committee also meets with current CM students for an open discussion regarding the CM program.

#### Co-curricular Activities

The CM faculty supports and encourages the involvement of construction management majors in at least one technical organization relevant to the construction enterprise.

#### DEPARTMENT OF ENGINEERING

Department Chair: Jane M. Fraser

Faculty: Bedoya Valencia, DePalma, Fraser, Jaksic, Paudel, Sarper, Yuan

The Department of Engineering offers the following engineering programs:

- The Bachelor of Science in Engineering with a Mechatronics specialization (BSE-Mechatronics)
- The Bachelor of Science in Industrial Engineering (BSIE)
- The Master of Science in Engineering (MS)
- The Master of Science in Industrial and Systems Engineering (MS)
- The Pre Engineering program
- The Minor in Engineering
- The Minor in Industrial Engineering

The BSE-Mechatronics is a 4-year program that can be completed at CSU-Pueblo. The program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The BS in Engineering with specialization in mechatronics is a flexible, broad degree that prepares graduates to work in many industries. Mechatronics combines mechanical and electrical engineering with computers to create devices that make our lives better. Electrical and mechanical systems, controlled by computers, are at the core of a wide range of processes and products. Robots, the Mars Rover, a heartlung machine, a computer controlled telescope, and a nano-scale microscope are all examples of mechatronics.

The BSIE is a 4-year program that can be completed at CSU-Pueblo. The program is accredited by the Accreditation Engineering Commission http://www.abet.org. As defined by the Institute of Industrial Engineers, "industrial engineering is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment, and energy. It draws upon specialized knowledge and skill in the mathematical and physical sciences, together with the principles and methods of engineering analysis and design, to specify, predict and evaluate the results to be obtained from such integrated systems." Industrial engineering is a major branch of engineering with applications in manufacturing, service, governmental, and non-profit organizations. Industrial engineers productivity and quality specialists who deal with the human aspects of work in addition to the advanced technologies of computer software and production related hardware.

A student can receive the BSE-Mechatronics and BSIE degree simultaneously by taking 30 additional credit hours

### Franklin L. Burns School of Real Estate and Construction Management - Course Descriptions

**XRCM - Online Executive Masters Courses** 

**Prerequisite Quarters** 

Course P	Number	Course Name	Course Description	(s)	Offering
смст	4020	Construction Codes/Documents	National/local building codes and regulations; relationship to specific construction contract documents; design, pre-bid, and bidding phase documents, forms of agreement, bonding and insurance; reading and interpreting codes and specifications.		Fall 13
CMGT	4170	Financial Management for Cons	Explore three perspectives of construction management: capital requirements for the construction company, cash flow requirements for project administration and asset acquisition requirements.		Winter 14
CMGT	4177	Energy Design for Sustainable	A study of electrical and mechanical systems used in both residential and commercial construction. Course content will include system design, component selection and utilization for energy conservation, cost estimating of systems, coordination and management of installation. Specific systems included are electrical, air conditioning, heating, ventilation and plumbing, fire protection, life safety, communication, power systems and lighting. The course will also explore emerging technology and environmental issues related to mechanical and electrical systems in buildings.	CMGT 4410	Spring 14
СМСТ	4180	Construction Layout/Surveying	Designed to provide the student with the theory, principles and techniques of construction layout and surveying. Includes field procedures in fundamental land surveying as well as site and foundation layout. An additional course fee does apply.		Fall 13, Summer 14
смдт	4300	Commercial Practicum I	This three-course sequence emphasizes practical application of commercial development and construction through development, construction and disposition of a small commercial project. Students work with developers, architects-engineers, attorneys, lenders, survey agents, contractors and brokers to plan, develop, construct and broker the site.		Winter 14
CMGT	4301	Commercial Practicum II	Continuation of CMGT 4300 (2 cr hrs)	CMGT 4300	Spring 14
смст	4401	Residential Practicum I	A three course sequence emphasizing practical application of the theories and concepts of residential development. Apply knowledge of general business, real estate and construction management practices by forming a student business entity, acquiring land, building and selling a residential property. Students apply accounting, finance, marketing, real estate and construction management techniques in the development of a single-family residence.		Winter 14
CMGT	4402	Residential Practicum II	Continuation of CMGT 4401	CMGT 4401	Spring 14

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### Franklin L. Burns School of Real Estate and Construction Management - Course Descriptions

XRCM - Online Executive Masters Courses

**Prerequisite Quarters** 

				riciequisite	Qualters
Course P	Number	Course Name	Course Description	(s)	Offering
СМСТ	4405	Residential Construction Syste	A study of residential construction systems. This course will analyze construction projects from concept and documentation to a survey of major structural systems. The relationship of each system and construction process is delivered through the use of actual construction drawings and documentation.		Fall 13, Spring 14
смдт	4410	Commercial Construction Syste	Continuation of CMGT 4405. Surveys common finish, environmental, mechanical and electrical construction systems; after introduction to pertinent systems, study of relationships and sequencing criteria critical to construction industry.	CMGT 4405	Winter 14, Summer 14
CMGT	4420	Construction Estimating	Integrated approach addressing construction accounting, estimating, purchasing, and management reporting systems.	CMGT 4410	Fall 13
CMGT	4480	Construction Project Manageme	Principles and techniques of construction project management, use of systems analysis, internal and external procedures, planning, programming, budgeting and staffing, controlling major projects, emphasis on construction scheduling techniques with case application.	CMGT 4410	Winter 14 Summer 14
CMGT	4700	Topics in Construction Mgmt	Topics vary per quarter.		Winter 14
CMGT	4800	NAIOP Challenge	Student teams analyze and formulate real-world solutions for an existing complex real estate problem, culminating in internal and external competitions. Includes a comprehensive written report and oral presentation. Prerequisite: instructor's permission.	Instructor Permission Required	Winter 13
REAL	4007	Computer Applications for Real Estate Analysis	Alternative analysis formats that can be applied to a wide array of real estate analysis issues; simulates working/ decision-making environment; structured overview of analysis tools focused on specific facets of multidimensional real estate decision-making environment; applications in investment analysis, feasibility analysis, valuation, market analysis, and report writing and presentation.	REAL 4407	Winter 14, Spring 14, Summer 14
REAL	4010	Real Estate Capital Markets	This course exposes students to the commercial real estate capital markets; including real estate investment trusts (REITs) and commercial mortgage-backed securities (CMBS), plus institutional investors. The complexities of capital market products are discussed, students receive a greater understanding of the alternatives that are available. The class includes lectures, guest speakers, readings, class discussions, a major REIT analysis project, and case studies.	REAL 4007	Spring 14

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### Franklin L. Burns School of Real Estate and Construction Management - Course Descriptions

XRCM - Online Executive Masters Courses

**Prerequisite Quarters** 

Course I	Number	Course Name	Course Description	(s)·	Offering
REAL	4110	Advanced Issues in Real Estate	This course concentrates on 10+ advanced real estate and construction management topics that vary each year including: green building; development issues such as planned communities; new zoning; water rights; negotiation skills; construction defects; design/build; current legal issues; plus new marketing techniques.  Focus on inbound and outbound U.S. real estate transactions and the cultural issues that impact these transactions. This can also be taken as a Burns Global	REAL 4407	Winter 14
REAL	4140	Global Perspectives in R/E	Delegation travel course.		Spring 14
REAL	4337	Real Estate Securities/Syndications/Entrepr eneurship	Introduces real estate securities with emphasis on private offerings, securities, registration requirements and exemptions, investor suitability, syndication, property acquisition, marketing the property, and tax and legal structure considerations.		Fall 13, Summer 14
REAL	4347	Management of Income Propert	Explore the complexities of managing apartments, condominiums, office buildings, industrial property and shopping centers. This course covers rental markets, development of rental schedules, leasing techniques and negotiations, repairs and maintenance, tenant relations, merchandising, selection and training of personnel, accounting, and owner relations.		Fall 13 Spring 14
REAL	4369	Real Estate Taxation	Tax factors affecting real estate investments; legal forms of ownership, depreciation, tax basis, tax impacts on exchanges, syndications, real estate securities, and other federal laws affecting real estate.		Winter 14, Summer 14
REAL	4400	Real Estate Concepts	Principles of real estate, real estate industry and its markets; legal aspects of home ownership from consumer's point of view, including property rights, title concepts, deeds, purchase contracts, listing contracts, law of agency, environmental issues and disclosures, types of mortgages, basics of home loan finance, appraisal investment and tax benefits. Partially satisfies Colorado real estate broker licensing requirements.	a-l	Fall 13, Winter 14, Spring 14, Summer 14
REAL	4407	Income Property Finance	Conventional and alternative (creative) financing techniques, mortgage banking, law and markets, loan underwriting analysis, the impact of monetary and fiscal policies on the real estate and mortgage markets, emphasis on case studies and microcomputer applications.		Fall 13, Spring 14, Summer 14
REAL	4417	Income Property Appraisal	Real estate valuation techniques used by appraisers, lenders, and investors; the cost, market, and income approaches of value as applied to commercial real estate investment properties; capitalization theory and techniques, mortgage equity, and discounted cash flow analysis.	REAL 4407	Fall 13, Winter 14, Spring 14, Summer 14

### Franklin L. Burns School of Real Estate and Construction Management - Course Descriptions

**XRCM - Online Executive Masters Courses** 

**Prerequisite Quarters** 

Course	Number	Course Name	Course Description	(s).	Offering
REAL	4438	RECM Legal Issues	Legal Issues in RECM - General contract and real estate law, including property rights, title concepts, deeds, purchase contracts, law of agency, environmental issues and disclosures, basics finance concerns, tax law, landlord-tenant law, construction contracts, indemnity agreements, rights and remedies of property owners, contractors and subcontractors issues, and various areas of liability for real estate practitioners and property owners.		Winter 14
REAL	4467	Advanced Real Estate Feasibilit	Commercial real estate development analysis & feasibility includes economic base analysis, tenant demand analysis, development and construction cost analysis, lease-up analysis, financial feasibility, leasing and property management practices. 5 major property types, office, industrial, retail, apartment and hotel are covered. This is a capstone class.	REAL 4007	Fall 13, Winter 14, Spring 14
REAL	4477	Income Property Investment	Comprehensive analytical framework for real estate investment decision-making, equity investment decisions via discounted cash flow, and risk analysis models and strategic planning concepts, structuring parameters to maximize rates of return while controlling downside risks; emphasis on theory, concept building, growth, sustainability and environmental issues and practical application to various types of investment properties.	REAL 4007	Fall 13, Winter 14, Spring 14, Summer 14
REAL	4500	Argus Financial Analysis	The central focus of this course is to expose the real estate student to a broad array of analysis and presentation tools, with practical applications of the Argus software through interactive examples and case studies. The course covers applications in Investment Analysis, Lease Analysis, Valuation, Feasibility Analysis Budgeting, Report Writing and Presentation. It is assumed that the student understands basic real estate principles and financial analysis.	REAL 4007	Fall 13, Spring 14
REAL	4700	Topics in Real Estate	Topics vary per quarter.		
REAL	4800	NAIOP Challenge	Student teams analyze and formulate real-world solutions for an existing complex real estate problem, culminating in internal and external competitions. Includes a comprehensive written report and oral presentation. Prerequisite: instructor's permission.	Instructor Permission Required	Winter 14
REAL	4980	Advanced Valuations & Report	Learn techniques not yet institutionalized nor commonly practiced in the field. Includes writing skills appropriate to specialized nature of appraisal reports, and composition of a complex filed problem report to prepare student for writing "demonstration" report required for MAI professional designation.	REAL 4417 & 4467	Summer 14

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### BSBA Degree Requirements - Construction Management Major

For students entering the University of Denver in the 2012-2013 academic year

Course #	Course Title	Prerequisites	Credits	Completed	
	nmon Curriculum	Frerequisites	52 - 60	completed	Curriculum Sequence
FSEM 1111	First Year Seminar		4		Considerations
WRIT 1122		FSEM 1111	4	-	
WRIT 1122	Writing and Rhetoric: Academic Writing				The Daniels Curriculum
	Writing and Rhetoric: Writing and Research	WRIT 1122	4-12	-	is sequential. Degree
Language	Foreign Language (FOLA)	N. C.	4-12		Check Points (DCB
Al- Natural	Analytical Inquiry: Natural (MATH 1200/1951)		4		1 & 2) serve as
	(grade below C- must be repeated)			-	collective prerequisites
Al- Society	Analytical Inquiry: Society		8		to ensure mastery of
SI- Natural	Scientific Inquiry: Natural		12		necessary content and
1 22 22 23 23	Scientific Inquiry: Society (ECON 1020)		4		background. Students
SI- Society	(grade below C- must be repeated)				may not enroll in
	Scientific Inquiry: Society (cannot be an ECON course)		4		courses in the next
ASEM	Advanced Seminar	Junior & entire	4		Check Point until they
12.102.000 N		Common Curriculum			have satisfied all
The second secon	uirements (courses with grades below 'C-' must be repeated)		12		requirements in the
ECON 1030	Micro and Macroeconomics 2	ECON 1020	4		current Check Point.
INFO 1010	Analytics 1: Data & Analysis (incl. MOS Certification)		4		
INFO 1020	Analytics 2: Business Stats & Analysis (incl. MOS Cert.)	MATH & INFO 1010	4		Courses Required for
Business Core F	Requirements (courses with grades below 'C-' must be repea	ted)	40	AT WELL	Secondary Admissions
BUS 1000	Gateway to Business		4		☐ MATH 1200 or
LGST 2000	Foundations of Business Law	Sophomore & BUS 1000	4		MATH 1951
ACTG 2200	Introduction to Financial Reporting	DCB 1	4		☐ INFO 1010
ACTG 2300	Accounting for Decision Making	DCB 1 & ACTG 2200	4		☐ INFO 1020
FIN 2800	Financial Decision Making	DCB 1 & ACTG 2200	4		☐ BUS 1000
MKTG 2800	Introduction to Marketing	DCB 1	4		☐ FSEM 1111
MGMT 2100	Management and Organizational Behavior	DCB 1	4		☐ WRIT 1122
INFO 2020	Analytics 3: Business Modeling and Analysis	DCB 1	4		☐ WRIT 1133
MGMT 2850	Business and Society	DCB 2	4		☐ ECON 1020
MGMT 3800	Business Policy and Strategy (Capstone)	Senior & entire B-Core	4		□ MOS
	lanagement Major Requirements (courses with grades below		40		
	rs allowed in major = 45				DCB 1
Required CMG			28		☐ 45 credit hours
CMGT 2110	Construction Codes & Documents	DCB 2	4	1	☐ FSEM 1111
CMGT 2160	Residential Construction Systems	DCB 2	4		☐ WRIT 1122
CMGT 2170	Commercial Construction Systems	DCB 2 & CMGT 2160	4	-	☐ WRIT 1133
CMGT 3100	Construction Estimating	DCB 2 & CMGT 2170	4		☐ MATH 1200 or
CMGT 3120	Project Scheduling & Control	DCB 2 & CMGT 2170	4	<del>                                     </del>	MATH 1951
REAL 1777	Introduction to Real Estate	DCB 2 & CIVICI 2170	4		☐ INFO 1010
	Real Estate Finance	DCB 2	4		☐ INFO 1020
REAL 3307		DCB Z			☐ ECON 1020
CMGT 3401,	irement		8		☐ ECON 1030
CIVIO1 3401,	Desidential Dynatious Sovies	DCD 2 8 CMCT 2160	8		□ BUS 1000
CMGT 3300,	Residential Practicum Series	DCB 2 & CMGT 2160			☐ LGST 2000
CIVIG 1 3300,	Communical Durations Contra	DCD 2 9 CMACT 2470	8		☐ MOS Excel
2201	Commercial Practicum Series	DCB 2 & CMGT 2170			☐ MOS Word
CMGT 3190	Residential Development + 1 elective from list below	DCB 2 & CMGT 2160	4		☐ MOS PowerPoint
Select one prea	approved course from Burns School list to complete the CM		4		
	Real Estate or Construction Management Elective	DCB 2	4		DCB 2
International E	xperience (see below)			JENE PRO	☐ 90 credit hours
					☐ ACTG 2200
	any minor credit hours here)		33-41		☐ ACTG 2300
	ort to create a well-rounded academic experience, students a	re strongly encouraged to tak	e elective h	nours	☐ FIN 2800
outside of the I	Daniels College of Business			1	☐ MGMT 2100
					☐ INFO 2020
					☐ MKTG 2800
					☐ Foreign Language
Total Credits fo	or BSBA – Construction Management Major		185	10 mm	

This document is an advising guide; it is not a substitute for meeting with an adviser. Students should meet with their adviser quarterly. The final responsibility for completing graduation requirements rests with the student. Program requirements are subject to change without notice.

#### Additional Information

- Only grades of "C-" or above may be used in completing business courses AND including ECON 1020, ECON 1030, INFO 1010, INFO 1020 and MATH 1200/MATH 1951.
- Repeated courses count toward the GPA calculation but not toward overall hours.
- A minimum average GPA of 2.0 is required for all major course work, all business course work, and the overall cumulative GPA in order to graduate.
- Students may take up to 8 hours in their major for which they have met prerequisites, prior to DCB Check Point 2.
- DCB Check Point 2 requires completion of the FOLA sequence. Please note that both the FOLA sequence and the SI-Natural sequence must be completed as graduation requirements.
- Students who successfully test beyond the first year of FOLA must take 4 hours of 2000 or 3000 level course work for the language into which they place or, take a 12 quarter-hour first-year sequence in a different language to complete the requirement.
- Microsoft Certification (MOS) requires standard levels of proficiency in Excel, Word, and PowerPoint; it is a DCB application requirement and a
  graduation requirement.
- Elective credits may be applied toward a minor within or outside Daniels (other than general business minor), a second major, or fulfilled through course work from any campus unit(s) with the exception of The Women's College and University College.
- At least 50% of required business courses for undergraduate business degrees (majors and minors) must be completed at the Daniels College of Business.
- For further information regarding the Common Curriculum, visit <a href="http://www.du.edu/commoncurriculum">http://www.du.edu/commoncurriculum</a>
- For further information regarding Study Abroad, visit <a href="http://www.du.edu/intl/abroad/index.html">http://www.du.edu/intl/abroad/index.html</a>

#### International Experience

Business students must be prepared to interact with persons from other cultures and to manage in circumstances where business practices and social conventions are different from the graduate's native country. To meet this requirement, all students must fulfill an international experience before they can graduate as a business major. Participating in the Cherrington Global Scholars program will satisfy this requirement; otherwise the requirement must be met via a Daniels College of Business course that covers global content. See an adviser for details. Note: International students meet this requirement by virtue of studying at DU.

#### The Burns School of Real Estate and Construction Management, Daniels 380

#### Department Chair:

See Burns School of Real Estate & Construction Management, DCB 380

#### Internship Approval:

See Burns School of Real Estate & Construction Management, DCB 380

#### Academic and Career Advising:

Office of Undergraduate Programs
Joy Burns Center, 3<sup>rd</sup> Floor
Appointments: 303-871-6910
DCBUndergrad@du.edu

#### Study Abroad Approval:

Dr. Jeff Engelstad jeffrey.engelstad@du.edu
Dr. Stuart Stein stuart.Stein@du.edu
Burns School of Real Estate & Construction Management, Daniels 380

#### **Career Services**

Gaining valuable work and internship experience throughout your time in Daniels is paramount.

Pioneer Career Pathfinder: Follow key professional development phases for a successful job search:

- Phase 1: SELF-ASSESS AND EXPLORE
- Phase 2: DEVELOP SKILLS

- Phase 3: SEARCH FOR JOBS AND INTERNSHIPS
- Phase 4: MAKE DECISIONS AND TRANSITION

Meet with a Career Counselor (schedule an appointment through WebCentral).

Rebecca Wolfe

Sue Worden

Academic & Career Adviser

Career Counselor

#### Attend a Career Fair to learn more about specific jobs and internships! Dates for 2012-2013:

- Fall 2012 Career & Internship Fair: 10/24/12, Gates Field House
- Winter 2013 Career & Internship Fair: 2/20/13, Gates Field House
- Spring 2013 Non-Profit and Government Career & Internship Fair: 4/17/13, Gates Field House

#### **Enhance Your Experience at Daniels**

- Daniels Undergraduate Programs Blackboard site (available via WebCentral) offers a complete array of policies and documents, as well as a full-service interactive site to assist you during all phases of your matriculation.
- To maximize your educational experience and position yourself as a student and for your future career, Daniels offers many co-curricular activities within our Backpacks to Briefcases program <a href="http://www.daniels.du.edu/b2b">http://www.daniels.du.edu/b2b</a>
- As well, you need to become involved in one or several of student organizations <a href="http://www.daniels.du.edu/students/studentorganizations.html">http://www.daniels.du.edu/students/studentorganizations.html</a>
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Daniels Vision: To be a premier business college globally recognized as a leader whose educational experiences, outreach, and knowledge creation transforms lives, organizations and communities.

# CONSTRUCTION MANAGEMENT COURSES

#### Department of Construction Management College of Health and Human Sciences

### CON 101 03(3-0-0). Introduction to Construction Management. F, S. Prerequisite: None.

Identify and understand relationships among participants in the construction process and its history.

### CON 131 02(0-4-0). Graphic Communications/CAD. F, S, SS. Prerequisite: None.

Reading technical drawings, manual drafting techniques, reprographic technologies. CAD applications are introduced.

### CON 151 03(3-0-0). Construction Materials and Methods. F, S. Prerequisite: None.

Materials and methods utilized in the design and construction of buildings.

### CON 251 02(1-2-0), Materials Testing and Processing. F, S. Prerequisite: CON 151.

Testing of construction materials for standards and quality. Conduct common quality tests and document the results.

### CON 261 03(2-3-0). Construction Surveying. F, S, SS. Prerequisite: CON 131 or INTD 166; MATH 125 or MATH 160.

Surveying fundamentals to field of construction, building layout, measurement procedures, vertical controls, line and grade, surveying, instrument operation.

### CON 265 03(2-2-0). Construction Estimating I. F, S. Prerequisite: CON 151

Integration of construction materials and methods into construction systems that will be incorporated in projects.

### CON 267 01(0-0-1). Construction Management Pre-Internship. F, S, SS. Prerequisite: None. Construction management majors only.

Skills and concepts related to successful internships within the construction management industry.

### CON 270 03(3-0-0). Introduction to Road Construction. F. Prerequisite: None.

Steps necessary to construct a paved roadway from conception, land acquisition and finance through paving operations and trafficking.

#### CON 317 02(2-0-0). Safety Management. F, S. Prerequisite: None.

Safety management in construction, corporate, and institutional environments.

### CON 351 02(1-2-0). Construction Field Management. F, S. Prerequisite: CON 251 or concurrent registration; CON 317 or concurrent registration.

Materials and methods used in construction, administrative and organizational planning used to complete a project. (\$)

### CON 352 02(1-2-0). Metal Fabrication for Construction. F, S. Prerequisite: CON 251.

Shaping, cutting, and joining of structural and non-structural metal. Emphasis on jobsite safety, economics, and efficiency.

### CON359 04(4-0-0). Structures I. F, S. Prerequisite: MATH 125; junior or senior standing

Behavior of structural components and systems, overview of structural engineering analysis/design process.

### CON 360 03(2-2-0). Electrical and Control Systems. F, S. Prerequisite:

Electrical and control systems and their application in the construction industry. (\$)

### CON 365 03(2-2-0). Construction Estimating II. F, S. Prerequisite: CON 265

Industry-recognized methods for work item analysis, quantity surveying, resource estimating, and bid development using work breakdown structures.

### CON 366 03(2-2-0). Construction Equipment and Methods. F, S. Prerequisite: CON 261.

Equipment/methods in heavy and highway construction; equipment selection, productivity, and costs. Infrastructure, tunneling, and trenchless technology.

# CON367 03(3-0-0). Construction Contracts/Project Administration. F, S. Prerequisite: CON 265; CON 351 or concurrent registration. Construction management majors and minors only.

Utilization of field engineering systems and procedures to effectively meet project objectives.

### CON 370 03(2-2-0). Asphalt Pavement Materials and Construction. F, S. Prerequisite: None.

Constituents of asphalt pavements; manufacture of asphalt cement, emulsions, and cutbacks; material properties and behavior. (\$)

# CON 371 03(3-0-0). Mechanical and Plumbing Systems. F, S. Prerequisite: CON 360 or concurrent registration or INTD 276 or concurrent registration.

Heating, ventilation, air conditioning, plumbing, and fire suppression with emphasis on design, operation, and interaction.

CON 384 Var[1-5]. Supervised College Teaching. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

### CON 450/INTD 450 03(3-0-0). Travel Abroad-Sustainable Building, SS. Credit not allowed for both CON 450 and INTD 450.

Major components of sustainable design and construction, energy, healthy buildings, natural resources, and other environmental issues.

#### CON 459 04(4-0-0). Structures II. F, S. Prerequisite: CON 359. Design of formwork, falsework, and shoring.

CON 461 03(2-2-0). Construction Project Scheduling and Cost Control. F, S. Prerequisite: CON 365 or concurrent registration. Construction management majors and minors only.

Strategies and techniques for efficient scheduling of project activities and control of project costs; emphasis on Critical Path Method.

### CON 462 03(3-0-0). Financial Management for Construction. F, S. Prerequisite: ACT 205 or ACT 210; MGT 305 or MGT 320.

Financial statements, financial ratios, applications of engineering economy, cash flow analysis, construction financing, and cost information systems.

### CON 464 03(1-0-2). Construction Leadership. S. Prerequisite: CON 365; CON 367 or concurrent registration; written consent of instructor.

Leading projects and people in a construction business and application of skills in a construction-based community service learning project.

# CON 465 03(1-0-2). Construction Management Professional Practice. F, S. Prerequisite: CON 461 or concurrent registration; CON 487A or CON 487B. Construction management majors only.

Professional practice using an understanding of the contractual and working relationships among all participants in the design/construction process.

### CON 469 03(2-0-1). Soils Engineering for Construction Managers. F, S. Prerequisite: CON 359.

Soil mechanics, foundation engineering, and foundation construction.

### CON 471 03(3-0-0). Project Management for Mechanical Systems. F. Prerequisite: CON 371; CON 365 or concurrent registration.

°Alternate year offering (odd); \* Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Fundamental principles of mechanical systems. Presentation and practice of management principles relevant to mechanical projects.

### CON 476 03 (3-0-0). Sustainable Practices-Design and Construction. F. Prerequisite: None.

Major components of sustainable design/construction: energy, healthy buildings, cultural, natural resources, use, other environmental/economic issues.

### CON 477 03 (3-0-0). Residential Aging-in-Place and Green Building. S. Prerequisite: CON 265.

Aging-in-place and green building aspects of the residential construction market.

#### CON 487A-B Var[3-6]. Internship. F, S, SS.

A) Construction Management I. (06(0-0-18). Prerequisite: CON 267; CON 367. B) Construction Management II. Prerequisite: CON 267; CON 367; 500 hours of documented work experience.

#### CON 495 Var. Independent Study-Construction.

CON 496 Var. Group Study-Construction.

### CON 500 03(3-0-0). Models of Disciplined Inquiry. F. Prerequisite: Admission to master's program.

Models and methods of disciplined inquiry used in diverse organizations; applying disciplined inquiry methods to solve problems.

### CON 560 03(3-0-0). Applied Project Management. F. Prerequisite: Admission to master's program.

Project development, planning, and control relevant to construction, manufacturing and technology education professionals.

#### CON 561 03(3-0-0). Applied Productivity Improvement.

S. Prerequisite: Admission to master's program.

Existing and emerging tools for productivity enhancement in project and production environment.

#### CON 562 03(3-0-0). Issues and Trends in Construction Management.

F. Prerequisite: Admission to master's program.

Current issues and trends related to management of technology in fields associated with manufacturing and construction industries.

### CON 565 03(3-0-0). Legal Aspects of Construction Process. S. Prerequisite: Admission to master's program.

Common points of dispute; methods of avoiding disputes among owner, architect, engineer, and contractor.

### CON 56603(3-0-0). Advanced Construction Estimating. F. Prerequisite: Admission to master's program.

Advanced estimating procedures dealing with special application and techniques in construction.

### CON 567 03(3-0-0). Preservation and Rehabilitation of Buildings. F. Prerequisite: Admission to master's program.

Theory and applications of preservation technology used in the management and rehabilitation of historic and archaic buildings.

### CON 568 03(3-0-0). Construction Industry Institute Practices. F. Prerequisite: CON 367.

Senior executives from the Construction Industry Institute (CII) present best practices developed by CII over the last 25 years.

#### CON 569 03(3-0-0). Regulatory Impact on Construction. S Prerequisite: Admission to master's program.

Role government plays in the design and construction of the built environment.

### CON 571 03(3-0-0). Facility Planning and Management. S. Prerequisite: Admission to master's program.

Planning, organizing, and managing large educational and/or commercial facilities

### CON 575 03(3-0-0). Managerial Decision Making for Constructors. F. Prerequisite: Admission to master's program.

Construction and real estate development applications of multidisciplinary managerial analysis and decision-making techniques.

### CON 576 03(2-0-1), Sustainable Technology in Built Environments. S. Prerequisite: CON 450/INTD 450 or CON 476.

Major components of creating environmentally sustainable built environments.

### CON 577 03(2-0-1). Leadership of Sustainable Community Projects. S. Prerequisite: CON 450/INTD 450 or CON 476. Required background check.

Learn and apply principles of sustainable construction management through leading and building service-learning projects.

CON 590 Var. Workshop.

CON 592 Var. Seminar.

CON 684 Var. Supervised College Teaching.

CON 687 Var[1-6]. Internship. Maximum of 6 credits allowed in course.

CON 695 Var. Independent Study.

CON 696 Var. Group Study. Prerequisite: Admission to master's program.

CON 698 Var. Research.

CON 699 Var[1-6]. Thesis.

<sup>°</sup>Alternate year offering (odd); \* Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

#### **GRADUATE COURSES**

#### BUSAD 501 Fundamentals of Statistics 3(3-0)

This class prepares students to solve business problems using statistics and business research methods using statistical estimation, hypothesis testing, and advanced statistical methods. Prerequisite: admission to MBA. (\*)

#### BUSAD 502 Business Ethics and Environment 3(3-0)

The impact of continued social, political, economic, technological, and legal pressures upon ethical business issues and managerial decision making. Prerequisite: admission to MBA or permission of MBA Director. (\*)

### BUSAD 505 Inferential Statistics and Problem Solving

Statistical methods in business, sampling, parameter estimation, hypothesis testing, correlation, multiple regression and chi square tests. Use of problem solving methods. (\*)

#### **BUSAD 545 Advanced Quantitative Analysis for** Business 3(3-0)

This class prepares students to solve business problems using advanced quantitative methods and business modeling techniques. Prerequisite: admission to MBA. (\*)

#### BUSAD 575 International Business 3(3-0)

The objective of this course is to familiarize students with the dynamics and complexity of managing business across the globe. Prerequisite: admission to MBA or permission of MBA Director. (\*)

#### BUSAD 580 Business Research Methodology 3(3-0)

Fundamentals of qualitative and quantitative research design including development of hypothesis and assessment techniques in preparation for undertaking research projects. Prerequisite: admission to MBA or permission of MBA Director. (\*)

#### BUSAD 591 Special Topics 3(3-0)

Prerequisite: admission to MBA or permission of MBA Director. (\*) Repeatable (6)

BUSAD 592 Research (1-6 VAR)
The student will work under the close supervision of a graduate faculty member in basic or applied research resulting in a thesis or report of high academic quality. (IP and S/U grading) (\*)

#### BUSAD 595 Independent Study (1-3 VAR)

Individual study of a subject determined by the instructor and student with permission of the director. Prerequisite: admission to MBA or permission of MBA Director. (\*) Repeatable (6)

### CIVIL ENGINEERING TECHNOLOGY (CET)

#### **UNDERGRADUATE COURSES**

CET 101 Intro to Civil Engineering Technology 2(1-2) Introduction to the field of Civil Engineering Technology: review career opportunities, study the engineering design process, explore issues of professional ethics, and do team projects. (F)

#### CET 102 Surveying I 3(0-6)

Beginning course in plane surveying; covers proper chaining techniques, care and use of engineering levels, differential leveling, traversing, and construction surveying. (F)

#### CET 103 Surveying II 3(0-6)

Introduction to land, topographic, and construction surveying. Prerequisite: CET 102, or permission of instructor. Corequisite: CET 116. (S)

#### CET 115 Civil Drafting I 3(0-6)

An introduction to basic drafting, AutoCAD and Structural Detail drafting. Corequisite: CET 102. (F)

#### CET 116 Civil Drafting II 3(0-6)

An introduction to maps, traverses, contours, plans and profiles, cut and fills. An introduction to architectural plans, elevations and section. Prerequisite: CET 115. Corequisite: CET 103. (S)

#### CET 202 Statics 3(3-0)

Basic concepts and application of static forces, couples, resultants, equilibrium, friction, frames, trusses, free body diagrams, and centroids. Prerequisite: MATH 121. (F)

#### CET 206 Strength of Materials 4(3-2)

A study of the response of materials to loads with attention to stresses, strains, elastic and plastic responses to loading. Experiments demonstrate those principles. Prerequisite: CET 202. (S)

#### CET 207 Construction Materials and Methods 3(3-0)

Properties, uses and methods of assembly of building materials as they apply to the construction industry. (F)

#### CET 208 Concrete and Asphalt Materials 3(2-2)

Study of Portland cement concrete and bituminous pavements. Manufacturing, mix design, placing and finishing of these materials. The laboratory includes ASTM testing of these materials. (S)

#### CET 222 Dynamics 3(3-0)

A study of the basic equations of motion, kinematics, kinetics, momentum, potential energy, work, and highway dynamics. Prerequisite: CET 202. (S)

#### CET 226 Engineering Problem Solving 2(1-2)

An introduction to computer programming to solve engineering problems that apply to the complete spectrum of civil engineering technology courses. Prerequisite: CIS 101 and 104 and MATH 121. (F)

#### CET 303 Construction Management 3(3-0)

Job specifications, contractor, organization, contracts, insurance and labor relations. Prerequisite: junior standing or permission of instructor. (S)

#### CET 304 Building Cost Estimating 3(3-0)

Estimating related to building construction industry. Quantity take-off, labor and material costs, records and assembling a general contractor's bid. Prerequisite: CET 207 or permission of instructor. (\*)

#### CET 305 Heavy/Highway Cost Estimating 3(3-0)

Estimating relating to heavy and highway construction. Covers heavy equipment selection and use, project scheduling and production rates. Prerequisite: junior standing or permission of instructor. (F)

### CET 312 Route Surveying 3(2-2)

Highway and route surveys, horizontal and vertical curves, grades, slope staking and earthwork. Prerequisite: CET 103 and MATH 124. (\*)

#### CET 315 Soil Mechanics Technology 3(2-2)

Basic principles of soil mechanics and foundation design as they apply to design and construction. ASTM field tests will be done in the laboratory. Prerequisite: CET 206. (S)

#### CET 316 Structural Analysis 3(3-0)

Introduction to the analysis of statically determinate and indeterminate structures. Prerequisite: CET 206, MATH 126, PHYS 201/L. (F)

CET 317 Hydraulics 3(2-2)

Study of non-compressible fluids including the flow of water in pipes and open channels. Laboratory involves measuring static pressure, head losses, and flow rates. Prerequisite: CET 202, MATH 126, PHYS 201/L. (F)

CET 372 Traffic Analysis and Control 3(2-2)

Introduction to traffic engineering including traffic system characteristics, traffic studies, capacity analysis, and traffic control. Laboratory activities include traffic data collection and analysis. Prerequisite: PHYS 201 or CET 222 or permission of instructor. (S)

CET 401 Land Surveying 3(3-0)

Boundary control, property descriptions, deeds, subdivisions, emphasizing the legal aspects of land law and surveying. Prerequisite: CET 103 or permission of instructor. (\*)

CET 404 Structural Steel Design 3(3-0)

Structural steel design of beams, columns, girders and trusses to AISC standards. Prerequisite: CET 316. (S)

CET 405 Reinforced Concrete Design 3(3-0)

Design of reinforced concrete beams, columns, girders and floor systems to conform to current ACI code. Prerequisite: CET 316. (F)

CET 412 Hydrology 3(3-0)

Hydrologic cycle including precipitation, streamflow, ground-water runoff and the preparation of hydro graphs and frequency analysis. Prerequisite: MATH 124, CET 317. (S)

CET 414 Bridge Design 3(3-0)

Design of bridge slabs, beams, abutments, wingwalls, piers, and footings. Prerequisite: senior status. (\*)

CET 415 Water and Sewer System Design 3(3-0)

Fundamental principles of water supply and sewage design. Prerequisite: CET 317, CHEM 111. (F)

CET 455 Senior Project Seminar 1(1-0)

Students formulate a proposal for their senior project and make written and oral presentations of the proposal. Speakers from industry present real-world examples. Prerequisite: senior standing in CET and permission by Department Chair. (S/U grading) (F)

CET 456 Senior Project 3(1-4)

Practical realistic projects relating to CET discipline are selected for design, analysis, and execution. Students prepare reports and make oral presentations. Prerequisite: CET 455. (S)

CET 473 Highway Design 3(3-0)

A study of highway planning and design. Prerequisite: MATH 126, CET 208, CET 315, CET 372. (F)

CET 475 Engineer-In-Training Preparation 3(3-0)

This course is designed as preparation for the state Engineer-In-Training examination. Subjects include general engineering and civil engineering topics. Prerequisite: senior standing or approval of instructor. (S)

CET 491 Special Topics (1-3 VAR)

Prerequisite: permission of instructor. (\*) Repeatable

CET 495 Independent Study (1-3 VAR)

Directed study for students interested in specific areas of CET. Prerequisite: junior standing in CET and permission of instructor. (F,S) Repeatable

CET 496 Cooperative Education Placement (1-4 VAR)

Industrial cooperative education work experience under the direction of a field supervisor and faculty member. Prerequisite: permission of instructor. (F,S,SS) Repeatable

#### **CHEMISTRY (CHEM)**

#### **UNDERGRADUATE COURSES**

CHEM 101 Chemistry and Society 3(3-0)

Chemistry related to the everyday world. Drugs, food, pollution, pesticides, consumer products, energy, and home health. Principally for non-science majors. (F,S)

CHEM 101L Chemistry and Society Lab 1(0-2)

Laboratory is optional. Experiments to exemplify the logical steps of problem solving and explore the physical and chemical world. Corequisite: CHEM 101. (F,S)

CHEM 111 Principles of Chemistry 3(3-0)

Fundamental laws, theories and principles of chemical reactions. Credit not applicable for chemistry majors or minors. Prerequisite: satisfactory math placement score or permission of the instructor. Corequisite: CHEM 111L. (F,S)

CHEM 111L Principles of Chemistry Lab 1(0-2)

Experiments using common chemical equipment and techniques to aid the student in learning what occurs in the chemical laboratory. Corequisite: CHEM 111. (F,S)

CHEM 121 General Chemistry I 4(4-0)

For science, engineering and pre-professional curricula. Atomic theory, chemical bonding, periodic properties, states evidetion-reduction. of matter, oxidation-reduction, stoichiometry, thermochemistry, inorganic nomenclature. Prerequisite: one year high school chemistry or equivalent, and College Algebra or equivalent math placement score. Corequisite: CHEM 121L.

CHEM 121L General Chemistry Lab I 1(0-2)

Corequisite: CHEM 121. (F,S)

CHEM 122 General Chemistry II 4(4-0)

Continuation of CHEM 121. Thermodynamics, kinetics, equilibria, nuclear chemistry, electrochemistry, acids and bases, solutions, descriptive inorganic chemistry. Prerequisite: CHEM 121. Corequisite: CHEM 122L. (F,S)

CHEM 122L General Chemistry Lab II 1(0-2)
Laboratory component to CHEM 122. Corequisite: CHEM 122. (F,S)

CHEM 150 (PHYS 150) Elementary Concepts in Physics and Chemistry 4(3-2)

Hands-on standards-based approach to understanding basic concepts of physics and chemistry. Integrated lecture, lab and discussion periods. (F,S,SS)

CHEM 160 Introduction to Forensic Science 3(3-0)

Overview of Forensic Science. Crime scene investigation. Evidence collection. Microscopy techniques. Arson analysis. Fingerprints. Serology and DNA use. Corequisite: CHEM 160L. (F,S,SS)

CHEM 160L Intro to Forensic Science Lab 1(0-2)

and collection. Microscopy techniques. Arson analysis, Fingerprints. DNA fingerprinting. Corequisite: CHEM 160. (F,S,SS) Overview of Forensic Science Laboratory. Evidence handling

CHEM 211 Introduction to Organic Chemistry 3(3-0)

Survey of organic chemistry chemical structure, reactivity and functional groups are presented in context of relevance to society. Prerequisite: CHEM 111. Corequisite: CHEM 211L

CHEM 211L Introduction to Organic Chemistry Lab

Survey of organic chemistry laboratory course. Basic organic laboratory techniques and skills, both micro and macro scale are presented. Prerequisite: CHEM 111. Corequisite: CHEM 211. (S)

#### CONSTRUCTION MANAGEMENT (CM)

#### **UNDERGRADUATE COURSES**

CM 101 Intro to Construction Management 2(1-2)

Identify and understand the relationships among participants in the construction process and its history. Including risks, construction processes, construction law, regulations and construction project delivery. (F)

CM 231 Statics and Structures 4(4-0)

An introduction to statics, strength of materials, and theory of structures and its applications to building construction. Prerequisite: PHYS 201, 201L and either MATH 122 or MATH 124. (F)

CM 320 Soils in Construction 3(2-2)
A study of soil as a construction material; including investigation, testing, classification, engineering properties and modification techniques, excavations, fills, slope stability, and pavement subgrades. Prerequisite: CM 231. (S)

CM 330 Wood Structural Systems 3(2-2)

A study of production and properties of wood, design methods for wood structural elements and fasteners, and production and erection methods of wood structures. Prerequisite: CM 231. (F)

CM 341 Concrete and Steel Structures 4(3-2)

A study of concrete and steel structures including design elements and construction methods for simple structural systems, joints, connections, fasteners, and concrete formwork. Prerequisite: CM 231. (S)

CM 351 Construction Planning & Scheduling 3(2-2) Principles and techniques of planning and scheduling for construction projects. Topics include bar charts, Critical Path Method, precedence networks and cost-time takeoffs. Prerequisite: CET 304 or CET 305. (S)

CM 391 Special Topics (1-3 VAR)

Prerequisite: permission of instructor. (\*) Repeatable

CM 445 Construction Safety 2(2-0)

The study of safe construction techniques, compensation OSHA insurance, regulations requirements, cost of accidents, and ethical conduct regarding safety. Prerequisite: CET 207. (S)

CM 451 Mechanical & Electrical Systems 4(4-0)

The study of mechanical and electrical systems associated with building construction: climate control systems, water and waste water systems, electric power and electronic communication systems. Prerequisite: PHYS 201, CET 207.

CM 461 Construction Law 3(3-0)

Legal documents and operation in construction management including business ownership and organization, business development through bidding and negotiations, contracts, during construction, communication insurance accounting. Prerequisite: CET 303. (F)

CM 465 Construction Accounting & Finance 3(3-0)

Construction project analysis/financial control including, cash flow analysis and management, overhead cost and break even analysis, time value of money, banking, and bonding. Prerequisite: ACCTG 201. (S)

CM 475 Senior Project 3(1-4)

An exercise in construction project analysis, cost estimating, scheduling, and the preparation and professional presentation of a project bid package for an organization. Prerequisite: senior standing in CM; must be within 2 semesters of graduation. (S)

CM 491 Special Topics (1-3 VAR)

Prerequisite: permission of instructor. (\*) Repeatable

CM 495 Independent Study (1-3 VAR)

Directed study for students interested in a specific area of CM. Prerequisite: junior or senior standing in CM major and permission of instructor. (F,S) Repeatable (2)

#### CHICANO STUDIES (CS)

#### **UNDERGRADUATE COURSES**

CS 101 Introduction to Chicano Studies 3(3-0)

Overview of the historical, political and socio-cultural experience of the Chicano. (F,S,SS)

CS 136 (HIST 136) The Southwest United States 3(3-0) This course traces the culture and historical development of southwestern United States, including contributions of the American Indian and Hispanic peoples.

(F,S)

CS 220 (ENG 220) Survey of Chicano Literature 3(3-0) of outstanding contemporary Chicano Literature deals with Chicano themes, including analysis of folklore and myth. (\*)

CS 230 (SW 230) Chicano: Social and Psychological

Study 3(3-0) Social and psychological forces faced in the Chicano community. (F)

CS 235 Ballet Folklorico 3(1-2)

The Mexican Folkloric Ballet class is designed with the interest of learning the history and art of an important part of Mexican culture, -Dance. II (\*) Repeatable (6)

CS 291 Special Topics (1-3 VAR)

Topics in Chicano studies, identified by interest. Prior work in Chicano studies student/faculty desirable. Repeatable

CS 303 Chicano Labor History in the United States 3(3-0) Chicano experience in the American labor market from 1848 to present. (\*)

CS 306 (WS 306) La Chicana 3(3-0)

A social cultural and historical overview of the Chicana experience and contributions. (F,S)

CS 325 (SW 325) Health in the Chicano Community 3(3-0) Health care traditions and current health care systems in the barrio. (S)

CS 341 (WS 341) Chicana Writers 3(3-0)

Survey of Chicana writers from the early 1900's to the present. Along with the literature, aspects of history, sociology and politics will be incorporated. (\*)

CS 346 (HIST 346) History of Mexico 3(3-0)

This course surveys the major political, economic, social and cultural developments of Mexico from pre-Columbian times to the present. (\*)

CS 401 (WS 401) Third World Feminisms 3(3-0)

This course focuses on Third World women's challenging views of global feminism and feminist representations of other

CS 420 Voices of Protest 3(3-0)

This course will highlight the contributions of people of color throughout the history of the United States. Prerequisite: junior or senior level standing. (F,S)

CS 485 Capstone 3(3-0)

Students will develop a project in which they will develop and execute a research assignment related to ethnicity, gender, or diversity. Prerequisite: senior level standing; permission of the instructor. (\*)

# Appendix 2

**Program Information** 



#### 2008 – 09 PETITION/PROGRAM SHEET

#### Degree: Bachelor of Science Major: Construction Management www.mesastate.edu/schools/sbps/busadm/mang.htm

#### About This Major . . .

Construction managers plan, direct, and coordinate a wide variety of construction projects, including the building of all types of residential, commercial and industrial structures, roads, and bridges. They are salaried or self-employed managers who oversee construction supervisors and workers. Construction managers coordinate and supervise the construction process from the conceptual development stage through final construction, insuring the project is completed on time and within budget. They are also responsible for the safety of the work environment. Graduates of the Construction Management Program will possess an OSHA 10-hour safety card upon graduation.

Potential majors must be comfortable with mathematics, technical instruction, physical science, computers, and software programs. They should work well under pressure and have good oral and written communication skills. At the end of the day, however, they are managers of processes and people and must excel in both technical and human interaction skills.

#### POLICIES:

- It is your responsibility to determine whether you have met the requirements for your degree. Please see the MSC Catalog for a complete list of graduation requirements.
- 2. You must turn in your "Intent to Graduate" form to the Registrar's Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
- This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
- 4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
- 5. Finally, the Department Head or the department administrative assistant will take the signed forms to the Registrar's Office. (Students cannot handle the forms once the advisor signs.)
- 6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your "Intent to Graduate" does not automatically move to a later graduation date.
- 7. NOTE: The semester before graduation, you will be required to take a Major Field Achievement Test (exit exam).

NAME:	STUDENT ID#	
LOCAL ADDRESS AND PHONE NUMBER:		
	( )	
I, (Signature) on the Program Sheet. I further certify that the grade list currently enrolled and the courses which I complete next s	, hereby certify that I have completed (or will ed for those courses is the final course grade received exceptemester. I have indicated the semester in which I will complete	complete) all the courses listed of for the courses in which I am ete these courses.
		20
Signature of Advisor	Date	
		20
Signature of Department Head	Date	
		20
Signature of Registrar	Date	

Students should work closely with a faculty advisor when selecting and	scheduling courses prior to registration.
Degree Requirements:	Course No Title Sem.hrs Grade Term/Trns
<ul> <li>120 semester hours total (A minimum of 28 taken at MSC)</li> <li>40 upper division credits (A minimum of 15 taken within the major</li> </ul>	OTHER LOWER DIVISION REQUIREMENTS
at MSC)  2.00 cumulative GPA or higher in all MSC coursework	Vinesialogy (2 samestar hours)
<ul> <li>2.00 cumulative GPA or higher in all MSC coursework</li> <li>2.00 cumulative GPA or higher in coursework toward the major</li> </ul>	Kinesiology (3 semester hours) KINE 100 Health and Wellness 1
content area	KINA I 1
When filling out the program sheet a course can be used only once.	KINA 1 1
<ul> <li>Excess KINA courses beyond the two required and pre-collegiate</li> </ul>	
courses (usually numbered below 100) cannot be used for	Applied Studies (3 semester hours)
graduation.	SPCH 102 Speechmaking 3
<ul> <li>Program sheets are for advising purposes only. Because a program may have requirements specific to the degree, check with your</li> </ul>	BACHELOR OF SCIENCE DEGREE DISTINCTION
advisor for additional guidelines, including prerequisites, grade	REQUIREMENTS (6 semester hours) Must receive a grade of "C" or
point averages, grades, exit examinations, and other expectations.	better
It is the student's responsibility to be aware of, and follow, all	
guidelines for the degree being pursued. Any exceptions or substitutions must be approved by the faculty advisor and/or	(3 semester hours higher than MATH 113)
Department Head.	Humanities or Social/Behavioral Sciences (3 semester hours)
See the "Undergraduate Graduation Requirements" in the Mesa	
State College catalog for additional graduation information.	CONCERNICATION WANTED THE TOTAL
GENERAL EDUCATION REQUIREMENTS (31 Semester Hours)	CONSTRUCTION MANAGEMENT MAJOR REQUIREMENTS (60 semester hours required fro ACCE Accreditation)
See the current Mesa State College catalog for a list of courses that	(60 semester nours required no ACCE Accreditation)
fulfill the requirements below. If a course is on the general education	Required Core (49 semester hours)
list of options and a requirement for your major, you must use it to fulfill	ACCT 201 Principles of Financial
the major requirement and make a different selection within the general	Accounting 3
education requirement.	BUGB 349 Legal Environment of Business 3 *FINA 301 Managerial Finance 3
Course No Title Sem.hrs Grade Term/Trns	MANG 201 Principles of Management 3
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)	Human Resource Management 3 MANG 371
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3	Human Resource Management 3 CONC 101 Construction Safety and
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 &	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3	MANG   371
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3	MANG   371
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English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3	MANG   371
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 & ENGL 112.)  Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and Electrical 3  CONC 208 Construction Equipment 3  CONC 218 Surveying 3  CONC 251 Construction Preparation (Codes, Permits, etc.) 3  *STAT 200 will be accepted as the prerequisite.  Required Concentration Courses (27 semester hours)
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 & ENGL 112.)  Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)  MATH 113 4*  *3 credits apply to the General Ed requirements and 1 credit applies to elective credit	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and Electrical 3  CONC 208 Construction Equipment 3  CONC 218 Surveying 3  CONC 251 Construction Preparation (Codes, Permits, etc.) 3  *STAT 200 will be accepted as the prerequisite.  Required Concentration Courses (27 semester hours)  CONM 316 Construction Materials
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 & ENGL 112.)  Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)  MATH 113  4*  *3 credits apply to the General Ed requirements and 1 credit applies to	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and Electrical 3  CONC 208 Construction Equipment 3  CONC 218 Surveying 3  CONC 251 Construction Preparation (Codes, Permits, etc.) 3  *STAT 200 will be accepted as the prerequisite.  Required Concentration Courses (27 semester hours)  CONM 316 Construction Materials and Methods 3
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 & ENGL 112.)  Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)  MATH 113 4*  *3 credits apply to the General Ed requirements and 1 credit applies to elective credit	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and Electrical 3  CONC 208 Construction Equipment 3  CONC 218 Surveying 3  CONC 251 Construction Preparation (Codes, Permits, etc.) 3  *STAT 200 will be accepted as the prerequisite.  Required Concentration Courses (27 semester hours)  CONM 316 Construction Materials and Methods 3  CONM 340 Advanced Construction
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 & ENGL 112.)  Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)  MATH 113 4*  *3 credits apply to the General Ed requirements and 1 credit applies to elective credit  Humanities (3 semester hours)	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and Electrical 3  CONC 208 Construction Equipment 3  CONC 218 Surveying 3  CONC 251 Construction Preparation (Codes, Permits, etc.) 3  *STAT 200 will be accepted as the prerequisite.  Required Concentration Courses (27 semester hours)  CONM 316 Construction Materials and Methods 3  CONM 340 Advanced Construction Estimating/Bidding 3
English (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)  ENGL 111 English Composition 3  ENGL 112 English Composition 3  (ENGL 129, Honors English, may be substituted for ENGL 111 & ENGL 112.)  Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)  MATH 113 4*  *3 credits apply to the General Ed requirements and 1 credit applies to elective credit  Humanities (3 semester hours)  Social and Behavioral Sciences (6 semester hours)	Human Resource Management 3  CONC 101 Construction Safety and Regulations 3  CONC 116 Building Materials 3  CONC 161 Building Mechanical and Electrical 3  CONC 208 Construction Equipment 3  CONC 218 Surveying 3  CONC 251 Construction Preparation (Codes, Permits, etc.) 3  *STAT 200 will be accepted as the prerequisite.  Required Concentration Courses (27 semester hours)  CONM 316 Construction Materials and Methods 3  CONM 340 Advanced Construction Estimating/Bidding 3  CONM 361 Advanced Building Systems 3
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History (3 semester hours)

Fine Arts (3 semester hours)

HIST

not listed above th	neral Physics 2	20 hours.)  Term/Trns	*STAT 200 Probal *CADT 106 Comp *CONC 270 Practi *CONM 499 Intern Manag *Strongly Recommende	uter Aided Design 3 cal Applications 4 ship in Construction gement 3	
SUGGES	TED COURSE SEQUENCIN	G FOR A	MAJOR IN CO	NSTRUCTION MANA	GEMENT
		FRESHM			
Fall Semester		Hours	Spring Semeste		Hours
ENGL 111	English Composition	3	ENGL 112	English Composition	3
CONC 101	Construction Safety and Regulations		CONC 218 CONC 161	Surveying Building Mechanical/Electric	3
MATH 113	College Algebra	4	PHYS 111	General Physics 4	cal 3
CONC 116 General Educati	Building Materials	3 <u>3</u>	PHYS 111L	General Physics Lab	1
General Educati	on Humanities	16	KINA Activity	General Physics Lab	1 1
		10	KINE 100	Health and Wellness	1
			KIIVE 100	reach and weinless	$1\frac{1}{6}$
	_	~~~~~			10
an order	L	SOPHOMO			
Fall Semester	B: 11 CE: 114	Hours	Spring Semeste		Hours
ACCT 201	Principles of Financial Accounting	3	MATH above N		3
ECON 201	Principles of Macroeconomics	3	ECON 202	Principles of Microeconomic	
CONC 208 MANG 201	Construction Equipment Principles of Management	3	PHYS 112 PHYS 112L	General Physics General Physics Lab	4
	cial/Behavioral Sciences	<u>3</u>	Elective (sugges		1
numanities of 50	cial/ benavior at Sciences	15	CONC 251		3
		15	CONC 231	Construction Preparation	$\frac{3}{17}$
	Г	JUNIOF	RYEAR		
Fall Semester	L	Hours	Spring Semest	er	Hours
Elective		3	CONM 340	Construction Estimating	3
MANG 371	Human Resource Management	3	FINA 301	Managerial Finance	3
Gen. Education	History	3	CONM 361	Advanced Building System	
CONM 316	Construction Materials/Methods		CONM 362	Structure Analysis	3
		$\frac{3}{12}$	KINA activity		1
			Gen. Ed. Fine	Arts	
					$\frac{3}{16}$
		SENIOR	RYEAR		
Fall Semester		Hours	Spring Semest		Hours
BUGB 349	Legal Environment of Business	3	CONM 472	Planning and Scheduling	3
SPCH 102	Speechmaking	3	CONM 480	Project Management	3
Elective		1	Elective		3
CONM 370	Managing Safety/Reg. Environment	3	CONM 499	Internship	<u>3</u>
CONM 401	Cons. Fin. Mgt.	3 <u>3</u>			12
CONM 462	Soil Foundation Construction	3			
		16			

Bachelor of Science: Construction Management Posted 2/5/08



#### 2009 -2010 PETITION/PROGRAM SHEET

Degree: Bachelor of Science Major: Construction Management www.mesastate.edu/academics/programs.html

About This Major ...

Construction managers plan, direct, and coordinate a wide variety of construction projects, including the building of all types offesidential, commercial and industrial structures, roads, and bridges. They are salaried or self-employed managers who oversee construction supervisors and workers. Construction managers coordinate and supervise the construction process from the conceptual development stage through final construction, insuring the project is completed on time and within budget. They are also responsible for the safety of the work environment. Graduates of the Construction Management Program will possess an OSHA I0-hour safety card upon graduation.

Potential majors must be comfortable with mathematics, technical instruction, physical science, computers, and software programs. They should work well under pressure and have good oral and written communication skills. They are managers of processes and people and must excel in both technical and human interaction skills.

#### POLICIES:

- It is your responsibility to detennine whether you have met the requirements for your degree. Please see the MSC Catalog for a complete list of graduation requirements.
- 2. You must turn in your 'Intent to Graduate" form to the Registrar's Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
- This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
- 4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
- Finally, the Department Head or the department administrative assistant will take the signed forms to the Registrar's Office. (Students cannot handle the forms once the advisor signs.)
- 6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your "Intent to Graduate" does not automatically move to a later graduation date.
- NOTE: The semester before graduation, you will be required to take a Major Field Achievement Test (exit exam).

NAME:	STUDENT ID #	-
LOCAL ADDRESS AND PHONE NUMBER:		
I, (Signature) on the Program Sheet. I further certify that the grade listed currently enrolled and the courses which I complete next sen	, hereby certify that I have completed (or will co for those courses is the final course grade received except the nester. I have indicated the semester in which I will complete	or the courses in which I am
Signature of Advisor	Date	20
Signature of Department Head	Date	20
Signature of Registrar	Date	20

Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration.

A Secretary Commence of the Co		
Degree	Requiremen	ts.

- 120 semester hours total (A minimum of 28 taken at MSC)
- 40 upper division credits (A minimum of 15 taken within the major at MSC)
  - 2.00 cumulative GPA or higher in all MSC coursework
- 2.00 cumulative GPA or higher in coursework toward the major content area
- When filling out the program sheet a course can be used only once.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- A student must follow the MSC graduation requirements either from I) the program sheet for the major in effect at the time the student officially declares a major; or 2) a program sheet for the major approved for a year subsequent to the year during which the student officially declares the major and is approved for the student by the department head. Because a program may have requirements specific to the degree, the student should check with the faculty advisor for additional criteria. It is the student's responsibility to be aware of, and follow, all requirements for the degree being pursued. Any exceptions or substitutions must be approved by the student's faculty advisor and Department Head.
  See the "Undergraduate Graduation Requirements" in the Mesa State College catalog for additional graduation information.

GENERAL EDUCATION REQUIREMENTS (31 Semester Hours) See the current Mesa State College catalog for a list of courses that fulfill the requirements below. If a course is on the general education list of options and a requirement for your major, you must use it to fulfill the major requirement and make a different selection within the general education requirement.

1		
Course No Title	Sem.hrs	Grade Termrrrn
English (6 semester hours, must receive a gr	ade of "C	" or better and
must be completed by the time the student ha		
ENGL 11 1 English Composition	3	157
ENGL 112 English Composition	3	( <del></del> :
Math: MATH 113 or higher (3 semester hou	ire muct	rossivo a suada
of C" or better, must be completed by the time		
semester hours.)	e the stud	icht has 00
MATH 113	4*	
*3 credits apply to the General Ed requirement	its and la	eredit applies to
elective credit	its and it	redit applies to
olocity of olocity		
Human ities (3 semester hours)		
raman mes (s semester means)		
		\$ <del></del>
Social and Behavioral Sciences (6 semester h	ours)	
ECON 201 Principles of Macroeconomics		
ECON 202 Principles of Microeconomics		-
		-
Natural Sciences (7 semester hours, one cours	e must ir	nclude a lab)
PHYS 111 General Physics	4*	
PHYS 111L General Physics Lab	1*	
PHYS 112 General Physics	4*	
PHYS 112L General Physics Lab	I*	V
7 credits apply to the General Ed requirement	s and 3 c	redits apply to
lective credit		POLICE STREET, PR. A. A. D. P. C. P. P. C. P. C. P. P.
28 PS 500 T		
listory (3 semester hours)		
IIST		9
ine Arts (3 semester hours)		

Course No	Title	Sem.hrs (	Grade TenTJrrrns
OTHER LO	OWER DIVISION REQUIRE	MENTS (6	semester hours)
Kinesiology	(3 semester hours)		
KINE 100	Health and Wellness		
KINA J			
KINA I			
	2000 West 1-2	<del></del> )8	
	idies (3 semester hours)		
SPCH 102	Speechmaking	3	
BACHELO	R OF SCIENCE DEGREE D	ISTINCTIO	N
REOUIREN	MENTS (6 semester hours) Mu	ist receive a c	rade of "C" or
better MATH	value (o competer flours) ivit	istreceive a g	grade of C of
899	nours higher than MATH 113)		
06			
Humanities	or Social/Behavioral Sciences	(3 semester l	hours)
CONSTRU	CTION MANAGEMENT MA	AJOR REQU	IREMENTS
(60 semester	hours required for ACCE Accre	editation)	
Regui-red Co	ore (33 semester hours)		
ACCT 201	Principles of Financial		
	Accounting	3	
BUGB 349	Legal Environment of Busine	ess 3	
*FINA 301	Managerial Finance	3	-
CONM 181	Principles of Const. Mang.	3	N <del>-</del>
MANG 371 CONC IOI	Human Resource Managemer	nt 3	V
CONC 101	Construction Safety and Regulations	2	
CONC 116	Building Materials	3	
CONC 161	Building Mechanical and	3	<del></del>
	Electrical	3	
CONC 208	Construction Equipment	3	
CONC 218	Surveying	3	
CONC 251	Construction Preparation		( <del> </del>
	(Codes, Permits, etc.)	3	
*STAT 200 wi	11 be accepted as the prerequisite.		91 ( 2-1-) 1 1 1 1 1 1 1 1
Required Co.	ncentration Courses (27 semes	eter hours)	
CONM 316	Construction Materials	ster nours)	
	and Methods	3	
CONM 340	Advanced Construction	200	<u> </u>
	Estimating/Bidding	3	
CONM 361	Advanced Building Systems	3	<del>10</del>
CONM 362	Structural Analysis-Statics/		
CONN. 270	Materials Strength	3	
CONM 370	Managing Safety and Regulatory Environment		
CONM 401	Construction Financial	3	
	Management	3	
CONM 462	Soil and Foundation	<i>.</i>	2
	Construction	3	
CONM 472	Planning and Scheduling	3	
CONM 480	Project Management (Capstone	e)3	

Electives (All college level courses appo	earing on your final transcript,	Course No Title	Sero.hrs Grade Termffri
not listed above that will bring your tota	l semester hours to I20 hours.)		
17 semester hours; 4 hours must be 300	or 400 level)	§STAT 200 Probability and Statistics	3
Course No Title	Sem.hrs Grade Tennffrn	s   §CADT 106 Computer Aided Design	3
MATH 113 College Algebra	1	§CONC 270 Practical Applications	4
PHYS 112 General Physics	2	§CONM 499 Internship in Construction	*
PHYS 112LGeneral Physics Lab	1	Management	3
		§Strongly Recommended. If a student takes all 1 reconunended courses, the student will still need upper division credit.	

### SUGGESTED COURSE SEQUENCING FOR A MAJOR IN CONSTRUCTION MANAGEMENT

	_	FRESHMAN	VEAD		
Eall Compater		FRESHWAN	Spring Semester	ar.	TT
Fall Semester Hours			Spring Semesic	<u> </u>	Hours
ENGL 111	English Composition	3	ENGL 112	English Composition	3
CONC 101	Construction Safety and Regulations	3	CONC 218	Surveying	3
MATH 113	College Algebra	4	<b>CONC 161</b>	Buildin g Mechanical/Electrical	3
CONC 116	Building Materials	3	CONM 181	Principles of Const. Management	3
General Educati	on Humanities	$_{16}^{I}$	Humanities or Soc	cial/Behavioral Sciences	J 15
	_	SOPHOMORE	YEAR		
Fall Semester	_		Spring Semeste	er	Hours
		Hour	1 0		22000
<u>s</u>					
ACCT 201	Principles of Financial Accounting	3	MATH above M		3
ECON 201	Principles of Macroeconomics	3	ECON 202	Principles of Microeconomics	3
CONC 208	Construction Equipment	3	PHYS 112	General Physics	4
PHYS 111	General Physics	4	PHYS 112L	General Physics Lab	1
PHYS 11IL	General Physics Lab	1	Elective (sugges		3
KINA Activity KINE 100	Health and Wellness		CONC 251	Construction Preparation	.1
KINE 100	ricattii and wenness	16			17
		JUNIOR Y			
Fall Semester			Spring Semest	er	<u>Hours</u>
		Hour			
<u>s</u> Elective		3	CONM 340	Construction Estimating	2
MANG 371	Human Resource Management	3	FINA 301	Managerial Finance	3
General Education	_	3	CONM 361	Advanced Building Systems	3
CONM 316	Construction Materials/Methods	Ĵ	CONM 362	Structure Analysis	3
		12	KINA activity		1
			General Educat	ion Fine Arts	J
					16
	_	SENIOR Y	FAR		
Fall Semester	-	DEI TOTE I	Spring Semeste	r	_Hours
Hours					110010
<b>BUGB</b> 349	Legal Environment of Business	3	CONM 472	Planning and Scheduling	3
Elective		I	CONM 480	Project Management	3
SPCH 102	Speechmaking	3	Elective	100	3
CONM 370	ManagingSafety/Reg. Environment	3	CONM499	Internship	
CONM 401	Cons. Fin. Mgt.	3			J 12
CONM 462	Soil Foundation Construction	J			
		16			

Bachelor of Science: Construction Management Posted 4/25/09



#### 2010-2011 PETITION/PROGRAM SHEET

Degree: Bachelor of Science Major: Construction Management www .mesastate.edu/academics/programs. html

About This Major . . .

Construction managers plan, direct, and coordinate a wide variety of construction projects, including the building of all types of residential, commercial and industrial structures, roads, and bridges. They are salaried or self-employed managers who oversee construction supervisors and workers. Construction managers coordinate and supervise the construction process from the conceptual development stage through final construction, insuring the project is completed on time and within budget. They are also responsible for the safety of the work environment. Graduates of the Construction Management Program will possess an OSHA 10-hour safety card upon graduation.

Potential majors must be comfortable with mathematics, technical instruction, physical science, computers, and software programs. They should work well under pressure and have good oral and written communication skills. They are managers of processes and people and must excel in both technical and human interaction skills.

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NAME:	STUDENT ID #			
LOCAL ADDRESS AND PHONE NUMBER:				
I, (Signature) on the Program Sheet. I further certify that the grade licurrently enrolled and the courses which <b>r</b> complete next	, hereby certify that I have completed (or will consisted for those courses is the final course grade received except for the semester. I have indicated the semester in which I will complete	or the courses in which I am		
Signature of Advisor	Date	20		
Signature of Department Head	Date	20		
Signature of Registrar	Date	20		

Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration.

quirements:

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- 2.00 cumulative GPA or higher in coursework toward the major content area
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English (6 semester hours, must rece			
must be completed by the time the stud	dent has 60 seme	ster hou	ırs.)
ENGL 111 English Composition	3		narcos <b>Z</b>
ENGL 112 English Composition	3		
Math: MATH 113 or higher (3 seme of "C" or better, must be completed by semester hours.)			
MATH 113	4*		
*3 credits apply to the General Ed requ	uirements and lo	credit ap	plies to

e credit			
nities (3	semester hours)		
		, <del></del>	
201	Principles of Macroeconomics	3	
202	Principles of Microeconomics	3	
111 111L 112 112L	General Physics General Physics Lab General Physics General Physics Lab	4*	
ts appl credit	y to the General Ed requirement	s and 3 credits app	ly to
(3 sem	ester hours)		
	and Be 201 202 Science 111 111L 112 112L ts apply	and Behavioral Sciences (6 semester It 201 Principles of Macroeconomics 202 Principles of Microeconomics Sciences (7 semester hours, one cours 111 General Physics 111L General Physics Lab 112 General Physics Lab 112 General Physics Lab ts apply to the General Ed requirement	and Behavioral Sciences (6 semester hours)  201 Principles of Macroeconomics 3  202 Principles of Microeconomics 3  Sciences (7 semester hours, one course must include a la 111 General Physics 4*  111L General Physics Lab 1*  112 General Physics 4*  112L General Physics Lab 1*  112L General Physics Lab 1*

Course No	Title	Sem.hrs Gr	ade Term/Trns
OTHER LO	OWER DIVISION REQUIRE	MENTS (6 s	emester hours)
Kinesiology KINE 100	(3 semester hours) Health and Wellness		
KINA 1			
KINA 1		<b>-</b> 0	
Applied Stud SPCH 102	dies (3 semester hours) Speechmaking	3	(**************************************
BACHELOI REQUIREM better MATH	R OF SCIENCE DEGREE DISTENTS (6 semester hours) Mus	STINCTION t receive a gra	ade of "C" or
(3 semester h	ourshigher than MATH 113)	1	1 <del>1992 - 11992 -</del> 91
Humanities	or Social/Behavioral Sciences (.	3 semester ho	urs)
CONSTRUC (60 semester	CTION MANAGEMENT MAJ hours required for ACCE Accred	OR REQUIR	REMENTS
Required Co	re (33 semester hours)		
ACCT 201	Principles of Financia 1		
	Accounting	3	
BUGB 349	Legal Environment of Business		
*FINA 301	Managerial Finance	3	
CONM 181	Principles of Const. Mang.	3	
MANG 371	Human Resource Management		The state of the s
CONC 101	Construction Safety and	. 3	
Manual Street Control of Control	Regulations	3	
CONC 116	Building Materials	3	7.
CONC 161	Building Mechanical and		
	Electrical	3	
CONC 208	Construction Equipment	3	
CONC 218	Surveying	3	SA
CONC 251	Construction Preparation		2 922 - 33
*STAT 200 will	(Codes, Permits, etc.) be accepted as the prerequisite.	3	-
Required Cor CONM 316	ncentration Courses (27 semester Construction Materials	er hours)	
2 2 2	and Methods	3	
CONM 340	Advanced Construction	5	
	Estimating/Bidding	2	
CONM 361	Advanced Building Systems	3	*
CONM 362	Structural Analysis-Statics/	3	
2 31111 302	Materials Strength	2	
CONM 370	and the same of th	3	1
COINN 370	Managing Safety and	80	
CONM 401	Regulatory Environment Construction Financial	3	- <del></del>
CONIVI 401		*	
CONIM 462	Management	3	
CONM 462	Soil and Foundation	20	
22	Construction	3	
CONM 472	Planning and Scheduling	3	
CONM 480	Project Management (Capstone)	13	

not listed above (17 semester ho Course No Titl *MATH 113 C *PHYS 112 G *PHYS 1 12LG	ollege Algebra 1	120 hours.) le Termffrns	§Strongly Recommend- recommended courses, upper division credit.	uter Aided Design 3 cal Applications 4 ship in Construction gement 3 edf a student takes all 13 hours of the strong the student will still need to take one addition	ly nal hour of
	=	FRESHMA		*	
Fall Semester	_	TRESHMA	Spring Semeste		1441
Tun Bennester		Hour	Spring Semeste		Hours
ENGL 111 CONC 101 MATH 113 CONC 116 General Educat	English Composition Construction Safety and Regulations College Algebra Building Materials ion Humanities	3	ENGL 112 CONC 218 CONC 161 CONM 181 Humanities or Soci	English Composition Surveying Building Mechanical/Electrical Principles of Const. Management ial/Behavioral Sciences	3 3 3 3 /
	N	SOPHOMOI	DEVEAD		
Fall Semester		SOLHOMOI	Spring Semester		-
2 0011 20 001120 0001		Hour	Spring Schiester		Hours
<u>s</u>					
ACCT 201	Principles of Financial Accounting	3	MATH above M.	ATH 113	3
ECON 201	Principles of Macroeconomics	3	ECON 202	Principles of Microeconomics	3
CONC 208	Construction Equipment	3	PHYS 112	General Physics	4
PHYS 111	General Physics	4	PHYS 112L	General Physics Lab	1
PHYS 111L KINA Activity	General Physics Lab	1	Elective (suggest		3
KINE 100	Health and Wellness	1	CONC 251	Construction Preparation	_J 17
	The state of the s	16			17
		II IVIOD V	(EAB		
Fall Semester		JUNIOR \			
Tall Schlester		Hour	Spring Semeste	er	Hours
<u>s</u>		Tiour			
Elective		3	CONM 340	Construction Estimating	2
MANG 371	Human Resource Management	3	FINA 301	Managerial Finance	3
General Education		3	CONM 361	Advanced Building Systems	3
CONM 316	Construction Materials/Methods	3	CONM 362	Structure Analysis	3
		12	KINA activity	The state of the s	1
			General Education	on Fine Arts	3
					16
		SENIOR Y	/FAR		
			· —- · · · ·		

Hour

1

3

3

3

/

16

Spring Semester

Plallling and Scheduling

Project Management

Internship

CONM 472

CONM 480

**CONM 499** 

Elective

Hours

3 3 3

1

12

Fall Semester

Legal Environment of Business

Soil Foundation Construction

ManagingSafety/Reg. Environment

Speechrnaking

Cons. Fin. Mgt.

**BUGB 349** 

SPCH 102

**CONM 370** 

**CONM 401** 

**CONM 462** 

Elective

#### 2010-2011 PETITION/PROGRAM SHEET

Degree: Bachelor of Science Major: Construction Management

#### About This Major . . •

Construction managers plan, direct, and coordinate a wide variety of construction projects, including the building of all types of residential, commercial and industrial structures, roads, and bridges. They are salaried or self-employed managers who oversee construction supervisors and workers. Construction managers coordinate and supervise the construction process from the conceptual development stage through final construction, insuring the project is completed on time and within budget. They are also responsible for the safety of the work environment. Graduates of the Construction Management program will possess an OSHA 10-hour safety card upon graduation.

Potential majors must be comfortable with mathematics, technical instruction, physical science, computers, and software programs. They should work well under pressure and have good oral and written communication skills. They are managers of processes and people and must excel in both technical and human interaction skills.

#### POLICIES:

- 1. It is your responsibility to determine whether you have met the requirements for your degree. Please see the Catalog for a complete list of graduation requirements.
- 2. You must tum in your "Intent to Graduate" form to the Registrar's Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
- 3. This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
- 4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
- 5. Finally, the Department Head or the department administrative assistant will take the signed forms to the Registrar's Office. (Students cannot handle the forms once the advisor signs.)
- 6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your Intent to Graduate" does not automatically move to a later graduation date.
- 7. NOTE: The semester before graduation, you will be required to take a Major Field Achievement Test (exit exam).

NAME:	STUDENT ID#	
LOCAL ADDRESS AND PHONE NUMBER:		700
I, (Signature) on the Program Sheet. I further certify that the grade li currently enrolled and the courses which I complete next	, hereby certify that I have completed (or will co sted for those courses is the final course grade received except for semester. I have indicated the semester in which I will complete	the courses in which I am
Signature of Advisor	Date	20
Signature of Department Head	Date	20
Signature of Registrar	Date	20

Bachelor of Science: Construction Management

Posted 8/10/11

Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration.

Degree Requirements:

\*7 credits apply to the General Ed requirements:

- 120 semester hours total (A minimum of 28 taken at CMU)
- 40 upper division credits (A minimum of 15 taken within the major at CMU)
- 2.00 cumulative GPA or higher in all CMU coursework
- 2.00 cumulative GPA or higher in coursework toward the major content area
- When filling out the program sheet a course can be used only once.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.

A student must follow the CMU graduation requirements either from 1) the program sheet for the major in effect at the time the student officially declares a major; or 2) a program sheet for the major apprO\ed for a year subsequent to the year during which the student officially declares the major and is approved for the student by the department head. Because a program may have requirements specific to the degree, the student should check with the faculty advisor for additional criteria. It is the student's responsibility to be aware of, and follow, all requirements for the degree being pursued. Any exceptions or substitutions must be approved by the student's faculty advisor and Department Head.

See the Undergraduate Graduation Requirements' in the catalog for additional graduation information.

GENERAL EDUCATION REQUIREMENTS (31 Semester Hours) See the current catalog for a list of courses that fulfill the requirements below. If a course is on the general education list of options and a

requirement for your major, you must use it to fulfill the major minimement and make a different selection within the general education requirement.

Course No Title	Sem.hrs	Grade	Tem1'Trns
English (6 semester hours, must receive	e a grade of "C	or bett	er and
must be completed by the time the stud-	ent has 60 seme	ster ho	ars.)
ENGL III English Composition	3		
ENGL 112 English Composition	3	1307 - 17.00	***

Math: MATH 113 or higher (3 semester hours, must receive a grade of "C" or better, must be completed by the time the student has 60 semester hours.)

MATH 113 4

\*3 credits apply to the General Ed requirements and 1 credit applies to elective credit

Humanities (3 semester hours)

ECON	201	Principles of Macroeconomics	3	
<b>ECON</b>	202	Principles of Microeconomics	3	****

Fine Arts (3 semester hours)

rine A	its (3 semester nours)		
Course	No Title	Sem.hrs	Grade Term!frns
Natural	Sciences (7 semester hours,	one course must i	nclude a lab)
	111 General Physics	4*	
PHYS	111L General Physics Lab	I *	
PHYS	112 General Physics	4*	
<b>PHYS</b>	112L General Physics Lab	1*	

\*7 credits apply to the General Ed requirements and 3 credits apply to elective credit

#### OTHER LOWER DIVISION REQUIREMENTS (6 semester hours)

Kinesiology KINE 100	(3 semester hours) Health and Wellness		
KINAI	Trouvel and 17 offices		*
KINA!			
Applied Stud	dies (3 semester hours)		
SPCH 102	Speechmaking	3	<u> </u>

CONSTRUCTION MANAGEMENT MAJOR REQUIREMENTS (69 semester hours required to meet ACCE Accreditation)

Required C	ore (36 semester hours)		
ACCT 201	Prin.of Financial Accounting	3	
<b>BUGB 349</b>	Legal Environment of Busine		
*FINA 301	Managerial Finance	3	
STAT 200	Probability and Statistics	3	
MANG 37	1 Human Resource	Management MATH	3 141
Analytical C	Geometry	3	* 1.5
CONC 10	Construction Safety	and Regs.	3
	2211	CONC 116	Building
Materials		3	
CONC 161	Building Mechanical and		
	Electrical	3	
CONC 208	Construction Equipment	3	
CONC 218	Surveying	3	
CONC 251	Construction Preparation		
	(Codes, Permits, etc.)	3	
*STAT 200 wi	ll be accepted as the prerequisite.	1 <del>2</del> 1	

Required Co	oncentration Courses (33 seme	ester	
hours) CONN			
	Management	3	
<b>CONM 316</b>	Construction Materials		G 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	and Methods	3	
<b>CONM 340</b>	Advanced Construction		<del>20 - 1 - 2 - 3</del> 2
	Estimating/Bidding	3	
<b>CONM 361</b>	Advanced Building Systems	3	*
CONM 362	Structural Analysis-Statics/		
	Materials Strength	3	
CONM 370	Managing Safety and the		
	Regulatory Environment	3	
CONM 401	Construction Financial		-
	Management	3	
CONM 462	Soil and Foundation		
	Construction	3	
CONM 472	Planning and Scheduling	3	
<b>CONM 480</b>	Project Management (Capston	e)3	
CONM 485	Construction Management	3	
	Issues		-

Course No Title	Sem.hrs	Grade	Term!frns	Course No Title	Sem.hrs	Grade	Term!frns
Electives (All college level courses appearing the listed above that will bring your total s	emester ho	ours to 1		§CADT 106 Computer Aided Design §CONC 270 Practical Applications	3 4		
(14 semester hours; 1 hours must be 300 or Course No Title			Term!frns	§CONM 499 Internship in Construction Management	3		
*MATH 113 College Algebra *PHYS 112 General Physics *PHYS 112LGeneral Physics Lab	2			§Strongly Recommended.			

### SUGGESTED COURSE SEQUENCING FOR A MAJOR IN CONSTRUCTION MANAGEMENT

	_	FRESHMAN	YEAR		
Fall Semester	) <del></del>		Spring Semeste	r	Hours
		Hour			
<u>s</u>					
General Educati	on Humanities	3	Humanities or So	cial/Behavioral Sciences	3
ENGL 111	English Composition	3	ENGL 112	English Composition	3
CONC 101	Construction Safety and Regulations	3	CONC 161	Building Mechanical/Electrical	3
<b>MATH 113</b>	College Algebra	4	CONM 181	Principles of Const. Management	3
CONC 116	Building Materials	1	Elective (sugges	tCADT 106)	1
		16			15
	<u></u>	SOPHOMORI			
Fall Semester		Hours	Spring Semester		Hours
ECON 201	Principles of Macroeconomics	3	ECON 202	Principles of Microeconomics	3
ACCT 201	Principles of Financial Accounting	3	MATH 141	Analytical Geometry	3
CONC 208	Construction Equipment	3	CONC 218	Surveying	3
PHYS 111	General Physics	4	PHYS 112	General Physics	4
PHYS IIIL	General Physics Lab	1	PHYS 112L	General Physics Lab	1
KINE 100	Health and Wellness	1	CONC 251	Construction Preparation	2.
KINA Activity		l			17
		16			
	_	HINHOP W	TAD		
F 11.6		JUNIOR Y	DATE OF THE PARTY		
Fall Semester		TT	Spring Semest	er	Hours
-		Hour			
§ General Education	on History	3	SPCH 102	Speechmaking	3
MANG 371	Human Resource Management	3	FINA 301	Manageria l Finance	3
CONM 362	Structure Analysis	3	CONM 361	Advanced Building Systems	3
CONM 340	Construction Estimating	3	CONM 370	Managing Safety and the Regulatory	3
CONM 316	Construction Materials/Methods	/		Environment	3
		15	KINA activity		1
					13
		SENIOR Y	EAR		
Fall Semester			Spring Semester	T*	Hours
Hours			<del></del>		
General Educatio	n Fine Arts	3	CONM 472	Planning and Scheduling	3
BUGB 349	Legal Environment of Business	3	<b>CONM 480</b>	Project Management	3
CONM 401	Construction Financial Management	3	CONM 485	Construction Management Issues	3
CONM 462	Soil Foundation Construction	3	CONM 499	Internship	3
Elective		/	Elective		/
		13			15

Bachelor of Science: Construction Management

Posted 8/10/11

#### 2012-2013 PETITION/PROGRAM SHEET

## COLORADO MESA

Degree:Bachelor of Science Major:Construction Management

#### About This Major...

Construction managers plan, direct, and coordinate a wide variety of construction projects, including the building of all types of residential, commercial and industrial structures, roads, and bridges. They are salaried or self-employed managers who oversee construction supervisors and workers. Construction managers coordinate and supervise the construction process from the conceptual development stage through final construction, insuring the project is completed on time and within budget. They are also responsible for the safety of the work environment. Graduates of the Construction Management program will possess an OSHA 10-hour safety card upon graduation.

Potential majors must be comfortable with mathematics, technical instruction, physical science, computers, and software programs. They should work well under pressure and have good oral and written communication skills. They are managers of processes and people and must excel in both technical and human interaction skills.

For more information on what you can do with this major, go to http://www.coloradomesa.edu/career/whatmajor.html.

#### POLICIES:

- I. It is your responsibility to determine whether you have met the requirements for your degree. Please see the Catalog for a complete list of graduation requirements.
- 2. You must turn in your "Intent to Graduate" form to the Registrar's Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
- 3. This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
- 4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
- 5. Finally the Department Head or the department administrative assistant will take the signed forms to the Registrar's Office. (Students cannot handle the forms once the advisor signs.)
- 6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your "Intent to Graduate" does not automatically move to a later graduation date.
- 7. NOTE: The semester before graduation, you will be required to take a Major Field Achievement Test (exit exam).

NAME:	STUDENT ID #	
LOCALADDRESSANDPHONENUMBER	R ————————————————————————————————————	
	, hereby certify that I have completed (or listed for those courses is the final course grade received ext semester. I have indicated the semester in which I will c	xcept for the courses in which I am
		20
Signature of Advisor	Date	
		20
Signature of Department Head	Date	
		20
Signature of Registrar	Date	

Students should work closely with a faculty advisor when selecting and scheduling courses prior to registration. Degree Requirements: 120 semester hours total (A minimum of 28 taken at CMU) OTHER LOWER DIVISION REQUIREMENTS (6 semester hours) 40 upper division credits (A minimum of 15 taken within the major Kinesiology (3 semester hours) 2.00 cumulative GPA or higher in all CMU coursework Health and Wellness KINE 100 C or higher in coursework toward the major content area KINA 1 When filling out the program sheet a course can be used only once. KINA I Pre-collegiate courses (usually numbered below 100) cannot be used for graduation. Applied Studies (3 semester hours) A student must follow the CMU graduation requirements either SPCH 102 Speechmaking 3 from I) the program sheet for the major in effect at the time the student officially declares a major; or 2) a program sheet for the major approved for a year subsequent to the year during which the \*FOUNDATION COURSES (24 semester hours) student officially declares the major and is approved for the student by the department head. Because a program may have requirements Prin. of Financial Accounting ACCT 201 3 specific to the degree, the student should check with the faculty **STAT 200** Probability and Statistics 3 advisor for additional criteria. It is the student's responsibility to MATH 141 Analytical Geometry 3 be aware of, and follow, all requirements for the degree being CONC IOI Construction Safety and Regs. 3 pursued. Any exceptions or substitutions must be approved by the **CONC 116** Building Materials student's faculty advisor and Department Head. Building Mechanical and **CONC 161** See the "Undergraduate Graduation Requirements" in the catalog Electrical 3 for additional graduation information. **CONC 208** Construction Equipment 3 **CONC 218** Surveying 3 GENERAL EDUCATION REQUIREMENTS (31 Semester Hours) See the current catalog for a list of courses that fulfill the requirements below. If a course is on the general education list of options and a requirement for your major, you must use it to fulfill the major \*CONSTRUCTION MANAGEMENT MAJOR REQUIREMENTS requirement and make a different selection within the general education (45 semester hours) requirement. Required Core (12 semester hours) Course No Title Sem.hrs Grade Termffrns **BUGB 349** Legal Environment of Business 3 English (6 semester hours, must receive a grade of 'C" or better and \*\*FINA 301 Managerial Finance must be completed by the time the student has 60 semester hours.) MANG 371 Human Resource Management ENGL 111 English Composition 3 CONM 264 Mech. ENGL 112 English Composition 3 and Indust. Systems Required Concentration Courses (33 semester Math: MATH 113 or higher (3 semester hours, must receive a grade hours) CONM 181Principles of Const. of "C" or better, must be completed by the time the student has 60 Management 3 semester hours.) CONM 316 Construction Materials **MATH 113** and Methods 3 \*3 credits apply to the General Ed requirements and I credit applies to CONM 340 Advanced Construction elective credit Estimating/Bidding **CONM 361** Advanced Building Systems Humanities (3 semester hours) CONM 362 Structural Analysis-Statics/ Materials Strength 3 Social and Behavioral Sciences (6 semester hours) **CONM 370** Managing Safety and the ECON 201 Principles of Macroeconomics 3 Regulatory Environment 3

Course No Title Sem.hrs Grade Term/Trns Natu ral Sciences (7 semester hours, one course must include a lab)

PHYS 111 General Physics 4\*

PHYS 111L General Physics Lab I\*
PHYS 112 General Physics 4\*
PHYS 112L General Physics Lab I\*

ECON 202 Principles of Microeconomics 3

History (3 semester hours)

Fine Arts (3 semester hours)

HIST

Posted 4/6/2012

\*7 credits apply to the General Ed requirements and 3 credits apply to elective credit

Bachelor of Science:Construction Management

CONM 401

**CONM 462** 

**CONM 472** 

**CONM 480** 

**CONM 485** 

3

3

3

Construction Financial

Planning and Scheduling

Construction Management

\*\*STAT 200 or CISB 241 will be accepted as the prerequisite.

Project Management (Capstone)3

Soil and Foundation

Management

Construction

Issues

Course No Title	Sem.hrs Grade Tenn/Trns	Course No Title	Sem.hrs Grade Term/Trns
Electives (All college level courses appe	aring on your final transcript,	§CADT 106 Computer Aided Design	3
not listed above that will bring your tota	al semesterhours to 120 hours.)	§CONC 270 Practical Applications	4
(14 semester hours; 1hour must be 300	0 or 400 level)	§CONM 499 Internship in Construction	
Course No Title	Sem.hrs Grade Tenn/Trns	Management	3
*MATH 113 College Algebra	I	§Strongly Recommended.	
*PHYS 112 General Physics	2		
*PHYS I 12LGeneral Physics Lab	1		

### SUGGESTED COURSE SEQUENCING FOR A MAJOR IN CONSTRUCTION MANAGEMENT

	-	FRESHMAN	VEAD		
Fall Semester		TRESIMAN	Spring Semeste	r	Hours
ran semester		Hour	Spring Semeste		Hours
<u>s</u>					
General Educati		3		cial/Behavioral Sciences	3
ENGL 111	English Composition	3	ENGL 112	English Composition	3
CONC 101	Construction Safety and Regulations	3	CONC 161	Building Mechanical/Electrical	3
MATH 113	College Algebra	4	CONM 181	Principles of Const. Management	3
CONC 116	Building Materials	J	Elective (suggest	t CADT 106)	J
		16			15
		SOPHOMOR	EYEAR		
Fall Semester		Hours	Spring Semester	r	Hours
ECON 201	Principles of Macroeconomics	3	ECON 202	Principles of Microeconomics	3
ACCT 201	Principles of Financial Accounting	3	MATH 141	Analytical Geometry	3
CONC 208	Construction Equipment	3	CONC 218	Surveying	3
PHYS 111	General Physics	4	PHYS 112	General Physics	4
PHYS 111L	General Physics Lab	1	PHYS 112L	General Physics Lab	1
KINE 100	Health and Wellness	1	<b>CONM 264</b>	Mechanical & Industrial Systems	.j
KINA Activity		<b>J</b> _			17
•		16			
		JUNIOR Y	EAR		
Fall Semester	-		Spring Semeste	er	Hours
T dil Delliester		Hour			TTOGTS
<u>s</u>					
General Education		3	SPCH02	Speechmaking	3
MANG 371	Human Resource Management	3	FINA 301	Managerial Finance	3
<b>CONM 362</b>	Structure Analysis	3	CONM 361	Advanced Building Systems	3
CONM 340	Construction Estimating	3	CONM 370	Managing Safety and the Regulatory	
CONM 316	Construction Materials/Methods	3		Environment	3
KINA activity			BUGB 349	Legal Environment of Business	J
		16			15
	_	SENIOR Y			
Fall Semester			Spring Semester		Hours
		Hour			
S Companyl Education	on Fine Arts	3	CONM 462	Soil Foundation Construction	2
General Education		3	CONM 480	Project Mahagehaethrogram Sheet, Page 3	3 2 of 3 2
CONM 401	Construction Financial Management	3	CONM 480 CONM 499	Internship	
CONM 472	Planning and Scheduling	3		mensiip	3
CONM 485	Construction Management Issues		Elective		J
Elective		12			12
		13			

Bachelor of Science: Construction Management Posted 4/6/2012

#### 2013-2014 PETITION/PROGRAM SHEET



Degree: Bachelor of Science Major: Construction Management

About This Major . . .

Construction managers plan, direct, and coordinate a wide variety of construction projects, including the building of all types of residential, commercial and industrial structures, roads, and bridges. They are salaried or self-employed managers who oversee construction supervisors and workers. Construction managers coordinate and supervise the construction process from the conceptual development stage through final construction, insuring the project is completed on time and within budget. They are also responsible for the safety of the work environment. Graduates of the Construction Management program will possess an OSHA IO-hour safety card upon graduation.

Potential majors must be comfortable with mathematics, technical instruction, physical science, computers, and so.ftware programs. They should work well under pressure and have good oral and written communication skills. They are managers of processes and people and must excel in both technical and human interaction skills.

For more information on what you can do with this major, go to http://www.coloradomesa.edu/career/whatmajor.html.

All CMU baccalaureate graduates are expected to demonstrate proficiency in critical thinking, communication fluency, quantitative fluency, and specialized knowledge/applied learning. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

- 1. Apply business knowledge and skills in appropriate business contexts and transfer knowledge and skills to new business situations. (Critical Thinking)
- 2. Produce professional business work products, independently and working as a team. (Applied Learning)
- 3. Communicate clearly, appropriately, and persuasively to the business audience, both orally and in writing. (Communication Fluency)
- 4. Integrate knowledge from multiple functional areas of business to solve business problems and to develop sound business strategies.(Specialized Knowledge)
- 5. Analyze business data critically, reason logically, and apply quantitative analysis methods correctly to develop appropriate business conclusions.(Quantitative Fluency)
- 6. Properly and appropriately use information systems tools and techniques within functional business areas. (Applied Learning)
- 7. Identify, formulate, and solve construction related problems by applying mathematics, science, and business principles. (Specialized Knowledge)

NAME:	STUDENT ID #			
LOCAL ADDRESS AND PHONE NUMBER:				
	, hereby certify that I have completed (or will rade listed for those courses is the final course grade received except te next semester. I have indicated the semester in which I will complete	for the courses in which I am		
		20		
Signature of Advisor	Date			
		20		
Signature of Department Head	Date			
		20		
Signature of Registrar	Date			

Students should work closely with a faculty advisor when selecting and Degree Requirements:		ourses prior to registration.  WER DIVISION REQUIREM	IENTS (6 sem	ester hours)
120 semester hours total (A minimum of 28 taken at CMU)	1		Divis (o sem	cotor nours)
40 upper division credits (A minimum of 15 taken within the major at CMU)	Kinesiology KINE 100	(3 semester hours) Health and Wellness		
<ul> <li>2.00 cumulative GPA or higher in all CMU coursework</li> </ul>	KINA J			-
C or higher in coursework toward the major content area	KINA I			
When filling out the program sheet a course can be used only once.	-0.7004/0.01			
Pre-collegiate courses (usually numbered below 100) cannot be	Annlied Stu	dies (3 semester hours)		
used for graduation.	SPCH 102	Speechmaking	2	
A student must follow the CMU graduation requirements either	3FCH 102	Speecinnaking	3	
from I) the program sheet for the major in effect at the time the student officially declares a major; or 2) a program sheet for the	*FOUNDAT	ΓΙΟΝ COURSES (24 semester h	iours)	
major approved for a year subsequent to the year during which the	ACCT 201	Prin. of Financial Accounting	3	
student officially declares the major and is approved for the student	STAT 200	Probability and Statistics	3	-
by the department head. Because a program may have requirements	MATH 141	Analytical Geometry	3	
specific to the degree, the student should check with the faculty	CONC IOI	Construction Safety and Regs		
advisor for additional criteria. t is the student's responsibility to	CONC 116	Building Materials	3	_
be aware of, and follow, all requirements for the degree being	CONC 161	Building Mechanical and	5	1
pursued. Any exceptions or substitutions must be approved by the	COILC IOI	Electrical	2	
student's faculty advisor and Department Head.	CONC 208		3	4
	1	Construction Equipment	3	
See the "Undergraduate Graduation Requirements' in the catalog	CONC 2 18	Surveying	3	
for additional graduation information.				
		JCTION MANAGEMENT MA	JOR REQUIR	EMENTS
GENERAL EDUCATION REQUIREMENTS (31 Semester Hours)	(45 semester	hours)		
See the current catalog for a list of courses that fulfill the requirements				
below. If a course is on the general education list of options and a		ore (12 semester hours)		
requirement for your major, you must use it to fulfill the major	BUGB 349	Legal Environment of Busines	s 3	
reguirement and make a different selection within the general education	**FINA 30 I	Managerial Finance	3	
requirement.	MANG 371	Human Resource Management	. 3	-
	CONM 264	Mech. and Indust. Systems	3	
Course No Title Sem.hrs Grade Tennffrns				
English (6 semester hours, must receive a grade of "C" or better and	Required Co	oncentration Courses (33 semes	ter	
must be completed by the time the student has 60 semester hours.)	hours) CONN			
ENGL 111 English Composition 3	8	Management	3	
	CONM 316	Construction Materials		
ENGL 112 English Composition 3	COIVIN 510	and Methods	3	
Divoz 112 Bilgion composition	CONM 340	Advanced Construction	3	
Math: MATH 113 or higher (3 semester hours, must receive a grade	COINN 540	Estimating/Bidding	3	
of "C" or better, must be completed by the time the student has 60	CONM 361			
semester hours.)	CONWI 301	Advanced Building	Systems	3
The state of the s	Structural Ar	nalysis-Statics/	_ CONM	362
MATH 113 4* *3 credits apply to the General Ed requirements and Icredit applies to	Structural Ar	Materials Strength		
	CONB 4 270		3	
elective credit	CONM 370	Managing Safety and the	1720	
II	GOVD 4 401	Regulatory Environment	3	
Humanities (3 semester hours)	CONM 401	Construction Financial		
		Management	3	
S. i. 1. I. D. I. v. i. v. I. C. i. v. a. (6 as most as house)	CONM 462	Soil and Foundation		
Social and Behavioral Sciences (6 semester hours)		Construction	3	
ECON 201 Principles of Macroeconomics 3	CONM 472	Planning and Scheduling	3	
ECON 202 Principles of Microeconomics 3	CONM 480	Project Management (Capstone	)3	
	CONM 485	Construction Management	3	
History (3 semester hours)		Issues		
HIST	**STAT200 or	r CISB 241 will be accepted as the pre	requisite.	
Fine Arts (3 semester hours)	Course No 7	Title S	em.hrs Grade	Termffrns
Course No Title Sem.hrs Grade Term/Trns	Electives (All	college level courses appearing of	n your final tr	anscript,
Natural Sciences (7 semester hours, one course must include a lab)	not listed abo	ve that will bring your total seme	ster hours to 1	20 hours.)
PHYS 111 General Physics 4*		hours; 1hour must be 300 or 400		
PHYS 111L General Physics Lab I*	Course No 7		em.hrs Grade	Termffrns
PHYS 112 General Physics 4*	The state of the s	College Algebra	I Grade	
PHYS 112L General Physics Lab I*		General Physics	2	
*7 credits apply to the General Ed requirements and 3 credits apply to		LGeneral Physics Lab	1	
elective credit	11115 1121		1	

3

4

\$CADT 106 Computer Aided Design \$CONC 270 Practical Applications §Strongly Recommended.

3

#### SUGGESTED COURSE SEQUENCING FOR A MAJOR IN CONSTRUCTION MANAGEMENT

		FRESHMAN	YEAR		
Fall Semester		Spring Semester			Hours
		Hour			
S General Education Humanities		3	Humanities or Social/Behavioral Sciences		3
ENGL 111	English Composition	3	ENGL 112	English Composition	3
CONC 101	Construction Safety and Regulations	3	<b>CONC 161</b>	Building Mechanical/Electrical	3
MATH 113	College Algebra	4	CONM 181	Principles of Const. Management	3
CONC 116	Building Materials	1		est CADT 106)	/
		16			15
		SOPHOMOR	E YEAR		
Fall Semester		Hours	Spring Semest		Hours
ECON 201	Principles of Macroeconomics	3	ECON 202	Principles of Microeconomics	3
ACCT 201	Principles of Financial Accounting	3	MATH 141	Analytical Geometry	3
CONC 208	Construction Equipment	3	CONC 218	Surveying	3
PHYS 111	General Physics	4	PHYS 112	General Physics	4
PHYS 111L	General Physics Lab	1	PHYS 112L	General Physics Lab	1
KINE 100	Health and Wellness	1	CONM 264	Mechanical & Industrial Systems	$_{l}$
KINA Activity		.1			17
		16			
8		JUNIOR Y		·	
Fan Semester		**	Spring Semes	ster	Hours
		Hour			
<u>s</u> General Educatio	on History	3	SPCH 102	Speechmaking	3
MANG 371	Human Resource Man!:lgement	3	<b>FINA 301</b>	Managerial Finance	3
CONM 362	Structure Analysis	3	<b>CONM 361</b>	Advanced Building Systems	3
CONM 340	Construction Estimating	3	<b>CONM 370</b>	Managing Safety and the Regulatory	
CONM 316	Construction Materials/Methods	3		Environment	3
KINA activity			<b>BUGB 349</b>	Legal Envirorunent of Business	/
		16			15
		SENIORY			
Fall Semester		**	Spring Semes	ter	Hours
***************************************		Hour		is	
<u>S</u> General Educatio	on Fine Arts	3	CONM 462	Soil Foundation Construction	3
CONM 401	Construction Financial Management	3	CONM 480	Project Management	3
CONM 472	Planning and Scheduling	3	CONM 499	Internship	3
CONM 485	Construction Management Issues	3	Elective		1
0011111 100					,
Elective					12

#### POLICIES:

- 1. It is your responsibility to determine whether you have met the requirements for your degree. Please see the Catalog for a complete list of graduation requirements.
- 2. You must turn in your Intent to Graduate, form to the Registrar's Office by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.
- 3. This program sheet must be submitted with your graduation planning sheet to your advisor during the semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.
- 4. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature.
- 5. Finally, the Department Head or the department administrative assistant will take the signed forms to the Registrar's Office. (Students cannot handle the forms once the advisor signs.)
- 6. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your 'Intent to Graduate' does not automatically move to a later graduation date.
- 7. NOTE: The semester before graduation, you will be required to take a Major Field Achievement Test (exit exam).

														_		_		_					_				
			mmer 2	2013		all 201			Term 20	-		Spring 20	144	-	mmer 2014		fe	B 2014			[erm	2015		oring 20	15	Summer	2015
Course Prefix & Number	Course Title	Day/Ni ght	Site	Mode	-52000 FW TW	Site	Mode	Day/Ni ght	Site		State of the	Site	Mode	Day/Ni ght	Site Mo	ode	Day/ Night		Mode	Day/Ni ght	Site	Mode	Day/NI ght	Site	Mode	Day/Ni ght	Site
CSCI 495	Independent Study Topics		-		DEM	M	CC	-			DEM	M	C	-	-		DEM	M	C	-		-	DEM	M	C	$\vdash$	
CSCI 496	Topics	_	-		DEM	199	·		-	_	DEM	m		_	-		DEM	M				-	DEM	M			
CONSTRUCTION MA	NACEMENT		-	70 ALC										-				155 7 250		-	-	-	1250			-	-
CONM 181	Principles of Construction Management		-		D	M	C	-			D	M	C	-	+	-	D	м	C		_	-	D	М	C		
CONM 264	Mechanical and Industrial Systems		-		0	M	C							-	_		0	M	C		_	-	-				-
CONM 316	Construction Materials and Methods				D	M	C	_							1		D	M	C			-	1377				_
CONM 340	Construction Estimating				D	M	C										D	M	C								
CONM 361	Advanced Building Systems		-		1000						D	M	C								- 117		D	M	C		- 100
																							1				
CONM 362	Structure Analysis - Statics/Materials Strength				D	M	C			-							D	M	C								
	Managing Safety and the Regulatory																C STANK										
CONM 370	Environment	1			Maria						D	M	C				2 March 194						D	M	C		
CONM 401											D	M	C										D	M	C		
CONM 462	Soil and Foundation Construction				200	1					D	M	C	3			Resulting.	01000	CO G			1	D	M	C		
CONM 472	Planning and Scheduling				0	M	C										D	M	C				1000				
CONM 480	Project Management				BEES.						D	M	C	0			23,50,50						D	M	C		
CONM 499	Internship in Construction Management	DEM			DEM						DEM			DEM			DEM		25/3/1			1	DEM				
					8 7 7																		100				
CONSTRUCTION TE																							S. S. S.				
CONC 100	Introduction To Trades				N	В	C				N	N	C								11.5-11		1				
CONC 101	Construction Safety & Regs				N	В	C					1				-	N	В	C				7000				
CONC 102	Electrical Safety				D	В	C												ART BEING				19000				
CONC 103	Rigging Safety Basic				D	В	C	_							-								1845			$\vdash$	
CONC 104	Architectural / Civil Print Reading				N	В	C		-								N	В	C				18/19/5				1000
CONC 116	Building Materials				N	В	C	-	-		100			1	-		N	В	C	-		-	1000	<b>BURNO</b>		-	
CONC 117	Building Materials Testing	_	-		D	-	c		-		N	В	С	-	-					-		-	N	В	C	-	
CONC 120	General Construction Framing Floor Framing	-	-	-	10	В		-	+ +		D	В	c	-		_				-		-	10.00				
CONC 121 CONC 122	Wall and Ceiling Framing	_	-	-	- M			_	-	-	D	8	C	-	+ +				45	-	_	1	1000				
CONC 125	Roof Framing Mat. & Methods	-	-		- 138 P	. 1		-	1	-	D	В	Č	2	-							-	1900				-
CONC 130	Windows & Exterior Doors				100		200	-	1		D	В	C	-	1		6.57158					1	1000			-	-
CONC 131	Exterior Trim	_			D	В	C					1.1				_	500 300		S. C.				(1) XE				
CONC 140	Stair Construction/Layout				1000			-			D	В	C										EE				
CONC 147	General Interior Finishes & Trim				0	В	C						100										100				and the same
CONC 161	Building Mechanical & Elec.				100						N	В	C										N	В	C		
CONC 196	Topics				DEM	В	. C				DEM	8	C				DEM	В	C				DEM	В	C		1000
CONC 201	Building Permits, Codes, Ethics				D	В	C										<b>以</b> 是1000000								30.00		
CONC 202	Intro. to Concrete Materials				D	В	C										TEST STATE										
CONC 203	Concrete Placing & Finishing	1									D	8	C					100					9.50				
CONC 205	Job Site Layout & Measuring		700000				Brah				D	В	C	1									1	HI 125 -			
CONC 208	Construction Equipment				580						N	- 8	C	-			2 2002			-	_	-	N	В	C	-	
CONC 215	Form & Foundation Systems	-	-		D	В	C	-				200	REGIST.	-	-		100			-	_	-	110			-	-
CONC 218	Surveying	-	-					_	-	_	N/D	В	С	-	-				100	-		-	N/D	В	C	-	
CONC 228 CONC 234	Estimating and Cost Control Commercial/Industrial Plans	-	-	-	N	В	C	-	-		N	В	C	1	+	-	N	В	C	-		+	N	В	С		
CONC 234	Thermal & Moisture Methods		-		1500	14.00	1	-	1	-	D	8	0		-	_	Saint Services			-	-	+	- N	В	· ·	-	
CONC 245	Project Management				N	В	C				N	8	C		1		SELL STORY		5 81 5	-	-	-	N	В	C	-	
CONC 251	Construction Preparation				N	8	C		1	-	4331.82					-		ATE .	No. of								
CONC 253	Cabinets/Countertop				25.57						D	В	c				and the second						ACL	-			
CONC 265	Plan. & Sched. for Cons. Super.				N	В	C				V. I		1/2									1	1	100			
CONC 270	Practical Applications				N	В	C					4 1					N	В	C			1	1.1.18				
					THE STATE OF							13474	100					1					100				
CRIMINAL JUSTICE					0.835												masi di						1				
CRJW 101	Basic Police Academy				D	В	C				D	В	С	3			D	В	C	D	В	С	1000				
CRJW 102	Basic Police Academy	1 1			D	B	C				D	В	C				D	В	C	D	В	С	Part of				
CRJW 105	Basic Law				D	В	C				D	В	c				D	В	C	D	В	С	STATE OF	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			1
CRJW 106	Arrest Control				D	В	C				D	B	C	2			D	B	C	D	В	С	200				
CRJW 107	Law Enforcement Driving		1		D	В	C				D	В	c	8			D	В	C	D	В	С	THE SE		The same		
CRJW 108	Firearms	-	-		D	В	C	-			D	В	С				D	В	C	D	В	С	18853	366			
CRMJ 201	Introduction to Criminal Justice		-		10141		131							2			D	M	C				D	M	C		C-2 10 2
CRJW 270	Homicidal Drowning Investigations		-	-	D	M	C				D	M	С				10000	13.50					Chipton	NEW S			
CRJW 280	Public Safety Diving Phase I	1	1		D	M	C	1		-	D	M	C	0.5			4 T 4 T 1 T 1 T 1 T 1 T 1 T 1 T 1 T 1 T						1000				

# Appendix 3

Majors and Minors

## Program Data CM 2009-2014

## **Majors and Minors**

				2009-1	.0	2010-1	1	2011-1	2	2012-1	.3	2013-1	4
Program	Degree	Code	Major	1st Major	All								
CM	PB	2903	Construction Mgt Prov Bacc			5	5	4	4	5	5	10	10
	BS	3180	Construction Management	58	64	68	73	58	66	60	64	64	67
Subtotal				58	64	73	78	62	70		69		77

Degrees Awarded

			2009-1	.0	2010-1	1	2011-1	2	2012-1	L3	2013-1	4
Program	Degree	Code Major	1st Major	All								
CM	BS	3180 Construction Management	1	1	6	6	8	8	8	8	8	8
Subtotal			1	1	6	6	8	8	8	8	8	8

# Appendix 4

Faculty Vitae,
FTES to FTEF,
Credit Hour Production,
Budget,
Library Report

## KELLY BEVILL, PE

kbevill@coloradomesa.edu Colorado Mesa University Grand Junction, CO

## **EDUCATION**

Cornell University, College of Engineering, Ithaca, New York

Master of Science, Civil and Environmental Engineering, August 2005

Minor: Toxicology

University of Colorado, Boulder, Colorado

Bachelor of Science, Environmental Engineering, December 2002

## PROFESSIONAL DESIGNATION

Professional Engineer (PE) Registered in the State of California

#### **EXPERIENCE**

## Colorado Mesa University, Grand Junction, Colorado

August 2011 - Present

Assistant Professor

- Preparation and instruction of multiple Construction Management courses
- Advising students in course selection and providing support for student job placement upon graduation
- Program coordination
- Involvement with local industries and contractors to support course teaching as well as provide program support

## InterTech Environmental & Engineering, Grand Junction, Colorado

August 2010 - July 2011

Project Manager / Environmental Engineer

- Oversight of pit closure activities at oil and gas drilling sites
- Involvement in pit liner and waste recycling program for multiple operators
- Development of Waste Management Plans for wastes associated with oil and gas exploration and production operations
- Project oversight and plan preparation for stormwater and Spill Prevention Containment and Countermeasure implementation and field activities

#### University of Auckland, Auckland, New Zealand

July 2009 - May 2010

Honorary Research Assistant and Laboratory Class Supervisor

- Novel microstructural analysis of separation membranes using Nomarski microscopy and Scanning Electron Microscopy
- Refinement of the production of hydroxyapatite by a proprietary technique
- Supervision of a chemical and materials laboratory class

#### ENGEO Incorporated, San Ramon, California

September 2005 - March 2009

Project Engineer

- · Environmental Site Assessments
- Site characterization work including budgeting, work plan preparation, field sampling (soil, groundwater and soil vapor sampling) and bioremediation design and implementation
- Preparation of health risk assessments and remedial action plans
- · Spill Prevention Containment and Countermeasure plan preparation
- Storm Water Management Plan and Notice of Intent document preparation
- Geotechnical soil logging, foundation recommendations, foundation plan review and grading plan review
- · Liquefaction analysis

#### Cornell University, Ithaca, New York

August 2003-August 2005

Graduate Research Assistant

- GC analysis of water samples taken from new and used PVC pipe to determine presence of vinyl chloride
- Method development and implementation for analysis of organotins in water taken from new and used PVC pipe
- Obtaining samples from community for analysis
- Designing a system to simulate water usage to determine leaching of vinyl chloride and organotins from PVC pipe over time

## University of Colorado, Boulder, Colorado

January 2003- June 2003

Assistant Faculty, Department of Mechanical Engineering

- Extraction of organics from air samples
- Use of GCMS to determine organics present in samples after completion of extractions

#### University of Colorado, Boulder, Colorado

May 2002-January 2003

Research Assistant

- Improvement in accuracy of data collection for the Personal Particle Speciation Sampler
- · Creation of a design to implement location and activity monitoring capabilities

## Walsh Environmental Scientists and Engineers, LLC, Boulder, Colorado June 2001-September 2002

- Responsible for completion of all AutoCAD drawings for multiple concurrent projects
- · Assisted Wetlands Group in several projects including restoration design
- · Improved knowledge and capability in other areas of GIS

## SOFTWARE PACKAGES

AutoCAD, MS Office Suite, gINT, GSLOPE, SLIDE, LiqIT, ArcGIS

## PRESENTATIONS Morgan Kay Bridge, Kelly Bevill. A Survey of Student Motivating Factors Impacting Freshman in an Introductory Business Class. Clute Institute International Academic

Conference. Las Vegas, NV. October 2014.

Morgan Kay Bridge, **Kelly Bevill.** *Increasing Retention in Business Classes through an Introductory Business Class.* Clute Institute International Academic Conference. Las Vegas, NV. September 2013.

## Troy L. Miller

2510 Foresight Circle
AEC 103
Grand Junction, Colorado 81505
970-248-1551
tlmiller@coloradomesa.edu

#### **PROFESSIONAL EXPERIENCE**

## Assistant Professor/

Program Director Construction Management - Colorado Mesa University (January 2013 to present)

#### Courses Taught:

Mechanical/Industrial Systems (CONM 264)

Construction Estimating (CONM 340)

Advanced Building Systems (CONM 361)

Managing Safety and the Regulatory Environment (CONM 370)

Construction Financial Management (CONM 401)

Planning and Scheduling (CONM 472)

Construction Project Management (CONM 480)

Construction Management Issues (CONM 485)

Professor of Construction Management - Brigham Young University Idaho (January 2004 to December 2013)

#### Courses Taught:

Building Information Modeling (Arch 280)

Framing Systems (Const 120)

Electrical Systems (Const 240)

Construction Estimating (Const 330)

Construction Project Management (Const 380)

Construction Seminar (Const 390R) Advanced

Estimating & Bidding (Const 400) Construction

Scheduling (Const 420)

Construction Company Management (Const 450)

Graduate Teaching Assistant (GTA) - Colorado State University (August 2002 - December 2003)

Construction Estimating (MC 363)

#### Professional Construction Services (Freelance) May 2003 - Present.

Since 2003 I have provided freelance professional construction services to general contractors in the construction industry. These services include detailed quantity survey for procurement of framing packages, budget estimating for preconstruction, cost estimating, subcontractor pre-qualification and procurement, development of storm water pollution prevention plans, development of project schedules, schedule updates and training in Timberline Precision Estimating software.

Assistant Project Manager/Estimator - Intermountain Construction, Inc. (September 1999 - July 2002)

Les Saisons, 680 Sun Valley Rd, Ketchum, ID 83340; mixed use resort facility; 10 million dollar GMP contract. <a href="https://www.lessaisons-sunvalley.com">www.lessaisons-sunvalley.com</a>

John Paul Day Lodge, Snow Basin, Weber County; Utah; Ski Lodge for 2002 Winter Olympic Games; 3 million dollar fixed sum contract. <a href="https://www.snowbasin.com/dining/johnpaul">www.snowbasin.com/dining/johnpaul</a>

Smith Sport Optics Office Building; Sun Valley, Idaho; 2.5 million dollar GMP Contract

Project Manager/Junior Estimator – Bateman-Hall General Contractors, Inc. (September 1997 – August 1999)

Estimator:

Typical scope of projects included retail box stores, elementary schools, high schools and churches with an intended traditional design-bid-build contract delivery.

Project Manager:

Circuit City, Ammon, Idaho; 1998; fixed sum contract Burger

King/Exxon, Salmon; Idaho, 1998; fixed sum contract

Wellsville Middle School, Wellsville, Utah; 1998; fixed sum contract Smiths Food & Drug remodel, Bountiful, Utah; 1998; fixed sum contract Super Wal-Mart Store, North Las Vegas, Nevada; 1997; fixed sum contract

## OTHER PROJECTS (personal residence)

Single Family Residence – 1,400 SF ranch style; 2 car garage; unfinished basement; 3901 Summerwood Lane, Ammon, Idaho; year built 2000

Single Family Residence – 4,000 SF 2 story; 3 car garage; 856 Heritage Road, Rexburg, Idaho; year built 2007

#### **EDUCATION**

Master of Science Degree in Construction Management (2004)

Colorado State University - Fort Collins, Colorado

Thesis: "A Paradigmatic Method for Decision Support in Construction Management" (2004) --- The study explored the possibility of using Building Information Modeling (BIM) for estimating and 4D simulations as a decision support tool for the construction manager.

**Bachelor of Science Degree in Construction Management** (1999)

Brigham Young University - Provo, Utah

## Program Data CM 2009-2014

## Ratio of full-time equivalent students (FTES) to Full-time equivalent faculty (FTEF)

		2009-10			2010-11			2011-12			2012-13			2013-14	
Subject	FTES	FTEF	FTES:FTEF												
CONM	7.0	1.1	6.2	9.2	1.2	7.9	11.	1.5	7.7	9.9	1.5	6.6	17.	1.8	10.

## Program Data CM 2009-2014

## Credit Hour Production, AY 2008-09 through 2012-13

				2009-10			2010-11			2011-12			2012-13			2013-14	
ourse	Title	Cr Hr	Sections	Enrolled	SCH	Sections	Enrolled	SCH	Sections	Enrolled	SCH	Sections	Enrolled	SCH	Sections	Enrolled	SCH
ONM			l					1			ĺ			î			
181	Princ of Construction Mgmt	3	1	17	51	1	19	57	1	21	63	1	19	57	2	28	٤
264	Mechanical/Industrial Systems	3	1		İ					0 0,000			20	٥,	1	14	9
316	Const Materials & Methods	3	1	10	30	1	11	33	1	11	33	1	13	30	1	13	4
340	Construction Estimating	3	ĺ		i	1	9	27	1	14	42	1	11	33	1		3
361	Advanced Building Systems	3	1	6	18	1	10	30	1	10	30	1	0	22	1	14 22	4
362	Statics/Material Strength	3	i			1	12	36	1	9	27	1	9	24	1		6
370	Safety and Regulatory Env.	3	1	11	33	1	6	18	1	8	24	2	17	24 E1	1	12	3
401	Construction Financial Mgmt.	3	1 1	5	15	1	7	21	1	11	33	1	1/	12	2	10	3
462	Soil and Foundation	3	1	8	24	1	10	30	1	11	12	1	- 4	10	1	16	4
472	Planning and Scheduling	3	j 1	7	21	-	10	30	1	12	36	1	0	18	1.	13	35
480	Project Management	3	1	5	15	1	6	18	1	12	36	1	5	15	1	14	4.
485	Construction Management Issues	3	i -	\$50	- 1	•			1	2	30 <u> </u>	1	5	15	1	14	4:
496	Topics	1	i		i	1	6	6		2	익				1	5	15
499	Construction Internship	3	j 1	1	3		•	1	1	1	اد		2				
ONMT		-50	9	70	210	10	96	276	12	115	345	12	99	297	14	175	52

		i					1					-11		
			FISCAL YEA	R 2009	FISCAL YEA	R 2010	FISCAL YEA	R 2011	FISCAL YEA	R 2012	FISCAL YEA	R 2013	FISCAL YEA	R 2014
Org 1130			ORIGINAL		ORIGINAL		ORIGINAL		ORIGINAL		ORIGINAL		ORIGINAL	The Control of the Co
		O ACCT TITLE	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL*
1130	5256	CN REGULAR FT WAGES	87,820	97,955	104,197	103,889	106,699	116,318	168,686	171,044	176,703	147,064	155,521	155,832
1130	5276	CN REGULAR PT WAGES	-		-	43	-	-	11,906	-	-		-	2
1130	5286	CN TEMPORARY FT WAGES	12	121	12	-	8,400	-	-	-		-		-
1130	5296	CN TEMPORARY PT WAGES	-	-	÷	6,329	.01	7,688	8,400	2,076	1,800	1,800	1,800	1,075
1130	5386	CN ANNUAL LEAVE PAYMENTS	+	701	-	727	-	1,119	-	381	-	3,523		1,378
1130	5396	CN SICK LEAVE PAYMENTS		130		-		-	-		-	-	- 4	130
1130	5416	CN DCPP TIAA CREF	-	-	-	4	: 2	1,004	-	1,226	-	5,948	-	10,223
1130	5426	CN DCPP FIDELITY	-	-		6	-	28	-	5,711		6,156		6,325
1130	5436	CN DCPP VALIC	-	10,654	-	11,439	7.	11,622	-	11,666	-	1,371	:#X	-
1130	5446	CN FICA-MEDICARE CONTRIBUTION	-	1,369	-	1,566		1,753	-	2,425		2,114		2,150
1130	5456	CN OTHER RETIREMENT PLAN		-	-	-	-	-	-	-	-	-	7,773	-
1130	5466	CN PERA	22,248	-	13,494	651	13,403	562	24,452	149	20,443	183	15,554	108
1130	5468	CN PERA - AED	-	-	4	123		184	-	58		61		40
1130	5469	CN PERA - SAED	-	-		73		138	-	49	-	54	1.00	37
1130	5506	CN DENTAL INSURANCE		428	-	760	-	785	-	793		444		666
1130	5516	CN HEALTH INSURANCE	10,260	5,070	11,121	6,548	11,886	10,914	30,630	13,020	21,394	10,698	22,448	15,142
1130	5520	CN HSA MATCHING	12	1,980	2	990	-	-	-	-		-	-	512
1130	5526	CN LIFE INSURANCE		406	9	413	¥	471	-	718		403		338
1130	5536	CN DISABILITY	-	247	=	255	-	275	-	402		290	-	=
1130	5706	STUDENT ASSISTANTS	-			291	8,000	2,657	8,000	4,265	8,000	-	8,000	957
1130	6100	PROFESSIONAL FEES EXTERNAL	-	79	2	2,237	1,000	408	1,000	125	-	1,722	4	9
1130	6150	EMPLOYEE TRAVEL - IN STATE	600	12	600	-	600	-	2,467	1,029	800	-	1,200	267
1130	6155	STUDENT TRAVEL - IN STATE	-	-		168	-	811			600	-	600	-
1130	6160	EMPLOYEE TRAVEL - OUT OF STATE	-				-	4,207	-	1,156	67	-	-	542
1130	6165	STUDENT TRAVEL - OUT OF STATE	-	7 <del>14</del> 3	2	14	-	(4,922)	-	-	1,000	2	1,000	-
1130	6201	SUPPLIES	- 2	590	2	2,184	6,300	3,024	6,300	2,376	5,800	1,354	7,370	2,504
1130	6203	SUPPLIES - COURSE FEE FUNDED	-	-	- 3	-	-	-	500	-	500	-	500	-
1130	6211	SOFTWARE	-	9.00	-	1,330	2,500	-	2,500	1,069	2,500	-	2,500	142
1130	6215	SOFTWARE - ACADEMIC	-	-	2	-	, B	-		-	-	-	-	2,136
1130	6230	PRINTING OFF-CAMPUS	-	-		52	12	-	250	535	450	-	450	171
1130	6255	TELECOMMUNICATIONS SERVICE	-	62		-	-	-	-	-	-	-	-	-
1130	6310	SUBSCRIPTIONS & BOOKS	-	944	-		-			-	-	1,402	-	655
1130	6350	PERSONNEL RECRUITING - IN STATE		-		15	-	190	+	-		-		-
1130	6401	TELEPHONE CALLS	150	145	150	114	200	37	200	41	55	11	45	16
1130	6410	TELEPHONE EQUIPMENT	750	363	750	1,188	792	1,485	792	1,947	1,980	2,277	2,376	2,046
1130	6430	POSTAGE	-	-	-	-	-	-	-	102		-	-	-
1130	6450	FREIGHT IN	-			15	-	-	-	-			-	-
1130	6470	DUES & MEMBERSHIPS	-		-	569		10	550	150	550	550	550	550
1130	6481	ADVERTISING - SEARCHES	41		-	70	2	279	-	-	-	-	-	-
1130	6501	EQUIPMENT REPAIR & MAINTENANCE	-	-		1,336	-	(714)	) -	460	500	66	1,500	-
1130	6550	MAINTENANCE SUPPLIES	-	-	-	-	-	-	-	176	-	-	-	-
1130	6570	VEHICLE MAINTENANCE SUPPLIES	-	-		11	-			-	-	-	-	
1130	6580	GAS AND OIL		-		-	-		-	47		-		*
1130	6760	RENT/LEASE EQUIPMENT	-	-	-	2,309	2,000	2,216	2,000	731	3,300	968	3,300	1,015
1130	6765	VEHICLE RENTAL	-	_	- 2	324	2	709	-	516		528	-	344
1130	6840	OFFICIAL FUNCTION MEETINGS SEMINAR	-	142	-	-	-	-	-	-	-	-		
1130	6850	OFFICIAL FUNCTIONS	(-)			-	-			-		499		
1130	6980	OTHER COSTS		*	*	100	1,000	-	1,000	-	500	-	500	2
1130	7150	PROFESSIONAL DEVELOPMENT		2	- 41	12	-		2	_	-			990
1130	8100	EQUIPMENT NON-CAPITAL		4,844		21,556	-	981		-	-			
1130	8101	COMPUTER EQUIPMENT NON-CAPITAL	-	4,793		3,669		-		7,766	-	-		
1130	8885	BUDGETED CHANGE TO FUND BALANCE			-			-						
1130	8090	CAPITAL EQUIPMENT	\$ -	\$ -	\$ -	\$ 5,963	\$ -	\$ (2,522)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		TOTAL EXPENDITURES		130823.4		177199.9		161714.9	-	232209.4		189485.1		206292.7

## Library Program Assessment John U. Tomlinson Library Colorado Mesa University

Date of Assessment: May 1, 2014

Purpose of Assessment: Program Review

Program under review: Construction Management (CM)

Program Level: Bachelor of Arts

Liaison: James Dildine

Collection Assessment: The Library of Congress subject headings used for this analysis were selected from catalog records for materials associated with Construction

Management. Subject headings include: Building — Dictionaries; Building — Estimates;
Building — Handbooks, Manuals, etc; Building Laws — United States; Building —
Superintendence; Building — Quality Control; Construction Contracts; Construction
Contracts — United States; Construction Contracts — United States — Handbooks, manuals, etc.; Construction industry — United States — Finance; Construction industry — United States — Management; Construction industry — United States — Quality Control;
Construction industry — United States — Safety Measures; Construction industry — Safety Regulations — United States; Constructors; Materials — Standards (all subheadings);
Project Management (include subheadings); Safety Regulations; Safety Regulations — United States; Safety Regulations — United States — Handbooks, Manuals, etc.

- 1. **Reference Support:** The following titles are representative of materials related to *construction management* held in the library reference area:
  - a. A dictionary of construction, surveying, and civil engineering, 2012
  - b. International building code, 2009
  - c. SHA standards for the construction industry (29 CFR part 1926): with amendments as of January, 2009
  - d. Annual book of ASTM standards, 2008
  - e. Dictionary of architecture & construction, 2006
  - f. Illustrated dictionary of building design + construction, 2005
  - g. Construction glossary: an encyclopedic reference and manual, 1980
  - h. Dictionary of architectural and building technology, 1986

b. **Monographic Resources:** There were a total of (338) monographic sources identified from a search of the Library of Congress subject heading (outlined above). The majority of these materials were in paper format (228), while (110; w/some cross-over) were in electronic format. The following table shows the items by publication year:

2000 – 2014:	208	
1990 – 1999:	91	
1980 – 1989:	28	
Before 1980:	11	

- c. **Periodicals:** A subject search of the *Periodical Locator* from the Library's homepage indicates full-text availability (print or online) for 118 periodical titles related to Technology Building Construction.
- d. **Electronic Resources:** The following online subscription indexes and databases provide coverage for this (Construction Management) concentration:

Academic Search Complete – Using the search term 'construction management' the following results were returned:

All sources, including interlibrary loan	6,309
Full-text	5.118
Full-text, peer reviewed	3.744
Academic Journals	99

Business Source Complete – BSC provides full-text to over 2,300 journals including access to over 1,100 peer-review journals

LexisNexis – provides access to full-text articles from trade publications, under the category Construction, Metals, and Architecture News

OmniFile Select - The Applied Science and Technology section should also provide support for this program.

As an example of the volume of materials available to patrons, a subject search of *all* materials (including inter-library loan) indicates full-text

availability of 488,511 items related to *Construction Management* [29,059 available as full-text, peer-reviewed]. Using the search terms *Construction Management* produces 360,426 available items from *all* the library resources, including inter-library loan. (86,482 available as full-text, peer-reviewed). Again using the search term *Construction Management* and the parameters full-text peer-reviewed electronic resources only, produced 3,640 items.

~	77	141-60	0.1	(1959) 88 978	44.4	
,	Evalu	1ation	of the	total	00	antion
4.	Lvait	iauvii	OI the	wai	COL	ICCLION

- a. Strengths: The library's electronic databases encompass a wide range of Construction Management materials.
- b. Weaknesses: Monographic materials are somewhat limited.
- 3. Recommendations: Continue to add electronic databases and update reference and other monographic materials.

Library Director:	Sylvia L. Rael	Date: _10/20/14

# Appendix 5

# Course Objectives, SLO's

OBJECTIVE MAKER.	FOR ALL BUSINESS DEPARTMENT GRA	DUATES: EACH (	CMU BUSINESS GRADUAT	E SHOULD BE A S	TRATEGIC DECISION

Critical Thinking Skills: Apply knowledge and skills in appropriate contexts and transfer knowledge and skills to new situations

Individual or Team Skills: Produce professional work products, independently and collaboratively

Communication Skills: Communicate clearly, appropriately, and persuasively to the audience, both orally and in writing

General Business Knowledge: Integrate knowledge from multiple functional areas of business to solve business problems and to develop sound business strategie.

Analytical Skills: Analyze business data critically, reason logically, and apply quantitative analysis methods correctly to develop appropriate conclusion

Information System Skills: Properly and appropriately use information systems tools and techniques within functional business areas

Specialized Knowledge in Construction Management: Identify, formulate and solve construction related problems by applying knowledge of mathematics, science and business principles

					OBJECTIV	VES		
	COURSES	Crit Think	Ind & Team	Commun	Bus Know	Analytical	IS	CM Knowledge
General Educat	ion*	В		В		В		
ACCT 201	Prin of Fin				В	В		
STAT 200	<b>Prob and Stats</b>	В				В	В	
ECON 201	Prin. Of Macroecon	В			В	_		
ECON 202	Prin. Of Microecon	В			В			
MATH 141	Analytical Geom							
CONC 101	Const Safety and Regs	В						В
CONC 116	Bldg Matls	В				TABLE STATES		В
CONC 161	Bldg Mech and Elec	В						В
CONC 208	Const Equip	В						В
CONC 218	Surveying					D		D
BUGB 349	Legal Environ of Bus	D			D			
FINA 301	Mgr Finance	D	D	D	D	D	D	
MANG 371	Human ResMgmt				D	D		
CONM 264	Mech and Indust Sys			D			D	
CONM 181	Prin of Const Mgmt		В		- 373			В
CONM 316	Const Matls and Mthds	В					<del></del>	D
CONM 340	Const Est/Bidding					D		A
CONM 361	Adv Bldg Sys					D		Α
CONM 362	Structural Analy	D					***	D
CONM 370	Safety and Reg Envir	D						D
CONM 401	Const Fin Mgmt			li.	А			A
ONM 462	Soil and Fdn Const			Α				Α
ONM 472	Plan and Schedule						Α	A
CONM 480	Project Mgmt	Α	Α	Α	Α	Α	Α	A
CONM 485	Const Mgmt Issues	(1.20)				Α		A

Bloom's Taxonomy (revised):
R Remember

U Understand
AP Apply
AN Analyzing
E Evaluate
C Create

Planned Assessments for Construction Management Program:
Critical Thinking: Project with departmental rubic in CONM 316
Individual & Team Skills: Project with departmental rubric in CONM 316
Communication: Project wih Departmental rubric in CONM 316

Analytical Skills: Project with Departmental rubric in CONM 316 Information Technology Skills: Project with Departmental rubric in CONM 316

CM Knowledge: American Institue of Construction Associate Construction Exam

## External Program Review

## Colorado Mesa University

## Construction Management Program

conducted by

L. Scott Hansen, Ph.D.

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Associate Professor of Engineering Technology Southern Utah University

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## **Executive Summary - Narrative**

On February 20<sup>th</sup> 2015 a campus visit was made to Colorado Mesa University to conduct an external review of the Construction Management program which included face to face interviews with administration, faculty and staff. These individuals included the President, Provost, Department Chair of Business, Construction Management faculty, Western Colorado Community College Construction Technology faculty, current CMU Construction Management students, alumni, Information Technology, Assessment, and Reference and Distance Services.

The current status of the program is excellent. The program enjoys enormous support from the entire University including upper administration. Enrollment is strong at approximately 80 students making it one of the largest CM programs in the region. The potential for the CM program to become one of the largest programs on campus is very likely in the near future.

The Construction Management program fits the goals and mission of the university by providing students with a strong liberal arts background along with career related instruction. Graduates of the program are in high demand which is typical for programs of this nature. The reviewer's findings indicate that the future of the Construction Management program at Colorado Mesa University is very bright.

## Executive Summary Template for External Reviewer's Observations

Program Review Element	Check the appropriate selection				Provide explanation if not
	Agree	Not Agree	Unable to Evaluate	Not Applicable	agree with element and/or why unable to evaluate
The program's self-study is a realistic and accurate appraisal of the program.	X				
The program's mission and its contributions are consistent with the institution's role and mission and its strategic goals.	X				
The program's goals are being met.	X				
The curriculum is appropriate to the breadth, depth, and level of the discipline.	X				
The curriculum is current, follows best practices, and/or adheres to the professional standards of the discipline.	X				
Student demand/enrollment is at an expected level in the context of the institution and program's role and mission.	X				
The program's teaching-learning environment fosters success of the program's students.	X				
Program faculty members are appropriately credentialed.	X				
Program faculty members actively contribute to scholarship, service and advising.	X				
Campus facilities meet the program's needs.	X				
Equipment meets the program's needs.	X				
Instructional technology meets the program's needs.	X				
Current library resources meet the program's needs.	X				
Student learning outcomes are appropriate to the discipline, clearly stated, measurable, and assessed.	X				
Program faculty members are involved in on-going assessment efforts.	X				
Program faculty members analyze student learning outcome data and program effectiveness to foster continuous improvement.	X				
The program's articulation of its strengths and challenges is accurate/appropriate and integral to its future planning.	X				

#### Notes from visit

## Meeting with Department Chair

The Construction Management program started in 2007. The fact that this program received approval at the beginning of the real estate bust is an indication of the forward thinking and vision that faculty and administration have at CMU. In 2007, similar programs at other universities were experiencing declining enrollment. The program currently has around 80 students. These are viable numbers for a Construction Management program at a University the size of CMU. The program is currently examining the possibility of becoming accredited either by ACCE (American Council on Construction Education) or ABET (Accrediting Board of Engineering and Technology). Accreditation under ABET would be under the Applied Science Accrediting Commission (ASAC) division. CMU's Construction Management program is currently articulated with Western Colorado Community College's Construction Technology 2 year degree. Faculty scholarly activity includes examining retention studies in Construction Management programs and implementing these findings. Valuable information on retention can be gathered from examining these types of studies. As part of their scholarly activities, CMU CM faculty might be encouraged to conduct their own retention study in an effort to gain information on how to retain students in the CM program. This study could also include examining the most effective methods of recruiting new students into the program.

The Department Chair described on going assessment efforts as related to the CM program. The reviewers visit with Assessment was able to validate the Department Chair's statements concerning on going assessment. The relationship between the Department of Business and Assessment appears very strong. The current Department Chair has done an excellent job of spearheading the assessment effort in the Business department. The director of Assessment indicated that the department of Business is the "flagship" of assessment on campus and would like to see this type of effort put into assessment in other departments.

CM's Student Learning Outcomes are aligned with the University outcomes and goals.

CM faculty were advised to examine the possibility of creating some type of General Education

course as a recruitment tool to increase enrollment. This course could simply be an introductory level overview type course on current construction methods. Quite a few CM students get a minor in Business. The CM degree is also designed with the first year of an MBA component.

## Meeting with President and Provost

CMU is a liberal arts college that offers additional programs typically not found at traditional liberal arts colleges. The reviewer was pleased to hear that administration is aware that university program offerings must reach beyond traditional liberal arts offerings. CMU offers a strong liberal arts foundation with programs that lead to employment and meet industry demand. Both the President and Provost are very supportive of the Construction Management program. The Construction Management program was added in an effort to attract industry to the region. The President and Provost are very conscious of CM program accomplishments. They were both aware of the fact that the CM program sends students to Reno, Nevada for regional Construction Management competitions. CM students referred to these competitions as "life changing". The President and Provost were also aware of the CM industry advisory board and how well the CM program is tied to regional industry. The President and Provost know what firms the CM program is tied into. President and Provost support accreditation for the CM program but indicated that CM faculty must decide which accrediting body fits the CM program best.

## Reference and Distance Services

CM program does offer some instruction in the form of distance education. This may be in part because of the applied nature of a number of the CM courses. Courses that include bidding, estimating and scheduling could be taught in distance format. Individuals at Distance Learning are more than willing to work with CM faculty in developing courses for online delivery. The CM program currently offers "blended" or "hybrid" instruction. This is a step in the right direction. The CM program would benefit from more "blended" or "hybrid" course

offerings. Business and Management courses could be developed for blended and hybrid delivery.

## Meeting with Students and Alumni

The current Department Chair does an excellent job of supporting faculty and students. Department Chair has enormous support from graduates as well. Student perception is that Western Colorado Community College is somewhat disconnected from CMU. Student perception also showed that WCCC and CMU's CM program is not 100% 2+2 articulation. The reviewer's observation is that WCCC and CMS's CM program are not disconnected. There appears to be a very strong partnership between both institutions. The reviewer wanted to inform CM faculty and CMU administration that student perception, is that somewhat of a disconnect exists between the two intuitions which is in the form on an articulation that is not 100% 2+2. Student perception of this disconnect is that not all CM courses taken at WCCC transfer to CMU's CM program.

Student perception also showed that the CM program needs more full time faculty and that current faculty are spread too thin. Students indicated that they would like to see more adjunct faculty used for trade classes. A discussion with students quickly followed asking why instructors need Master's degrees and why a Bachelor's degree is not sufficient to teach at the University level. It was explained to them that University accreditors actually prefer Doctoral level professors. Students also expressed concern about offering classes at 2 different campuses. The starting and ending times which equates to traveling from one campus to another in 10 minutes or less was a concern. Students also would like to see more heavy civil introduced into the program. Student explained that many job opportunities were in "horizontal" construction as well as "vertical" construction. Other students wanted instruction more focused on residential construction.

Students also felt like participation at the Reno, NV competition are crucial or "life changing". Students work in teams on a given real world industry project. It is a chance for them

to apply what they have learned in the classroom in a real world setting. Typically industry representatives conduct these competition which forces students to "fly solo" for the first time in their college career. Students get a feel for what the "world of work" is going to include. Students feel that these competitions are life changing because they get to compete against other schools which promotes a sense school spirt. These competitions are similar to some type of playoffs that only athletic students experience. Success that students experience at these competitions provides a feeling of accomplishment. Students also interact with other CM students and make industry connections for possible future careers at the types of competitions. They are also good indicators for faculty to assess how well they are preparing students for future employment. Students also enjoy the many internship opportunities that are available to CM students. This is further evidence that the CM program is meeting the needs of industry as well as preparing CM graduates for careers in CM.

## Meeting with Library Staff

CMU library assigns liaisons to work with each department in an effort to assist faculty in setting up a library guide. Library liaisons are more than willing to work with CM faculty in this effort. The library can also obtain DVD's that CM faculty can use in class.

## Meeting with Assessment Staff

Assessment indicated that the entire Department of Business under the direction of the current Department Chair is on the cutting edge of assessment. The current Department Chair has done an excellent job in working with faculty in the assessment effort. The CM program needs is encouraged to piggy back assessment of student learning outcomes on accreditation student learning outcomes. This will result in streamlining of the assessment process for CM faculty and CMU administration and assessment.

## Meeting with Facilities Staff

CM facilities are currently adequate for the number of students enrolled in the program. The teaching of trade related courses at WCCC is advantageous to the program. One concern to keep in mind is the current enrollment restrictions for classes taught at WCCC. Over time, increases in enrollment may dictate that computer type courses currently taught at WCCC may have to be moved to CMU.

## Recruiting

CM faculty need to keep recruitment and retention at the forefront of their efforts. The program currently has strong enrollment. Dealing with too many students is a problem that few CM programs experience. Dealing with too few students is a much bigger problem. If faculty lines are desired, enrollment will dictate whether they are filled or not.

## Information Technology

Information Technology is very supportive of the CM program and indicated they were willing to assist with any need the CM program may have.

## Recommendations and Goals

#### **Short Term Goals**

Short term goals ranked in order for the CM program might include:

- Continue to grow the program in an effort to increase enrollment. This will add validity and credibility to the program as a whole. This will also help meet industry need for graduates
- 2. Continue to build industry partnerships by providing students with internship opportunities. This will help students land gainful employment which aids in reporting employability of graduates to new and potential students.
- 3. Meet with current CM students and identify why the perception of disconnection between WCCC and CMU exists and resolve it. This is probably a very simply matter that could be handled with a 30 minute student meeting/pizza party.
- 4. Invite CMU upper Administration to accompany CM students to the Reno competitions. This would allow Administration to witness first hand the "life changing" experience that CM students speak of.

## **Long Term Goals**

Long term goals ranked in order for the CM program might include:

- 1. Continue to take students to the Reno, NV competitions. This will allow students to make industry contacts for future employment.
- 2. Grow enrollment in an effort to receive a new faculty line. This new faculty member can bring a different area of expertise to the CM program.
- 3. Examine the creation of three separate Residential, Commercial and Heavy Civil tracks in the CM program to allow students to pursue areas more closely aligned with their interests.

#### Conclusion

The Construction Management program at Colorado Mesa University appears to have strong support at all levels. Enrollment in the program is strong which is an added bonus. Once the real estate market rebounds, the CM program should grow exponentially.

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