



Bachelor of Technology in Construction Management

2015 Program Review

*In 2016 this Program will be renamed the Bachelor of Applied Science

Degree:	Bachelor of Technology Construction Management
Academic Division:	Career and Technical Education
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1. Program Description

A. College and Program Mission

College Mission	Program Mission
Western Nevada College inspires success in our community through opportunities that cultivate creativity, intellectual growth and technological excellence, in an environment that nurtures individual potential and respects differences.	The mission of the Bachelor of Technology degree in Construction Management is to prepare students for entry level and mid-level positions within the various construction industry disciplines, and to meet the goals of the Technology Division.

B. College and Program Goals

College Goals	Program Goals and Outcomes
<ul style="list-style-type: none">• Improve student success in program completion and graduation rates• Ensure institutional excellence in teaching, programs, and services• Embrace our college's many communities and respond to their diverse needs	<ol style="list-style-type: none">1. Knowledge in basic economic principles, business principles and construction accounting, finances, and law (*ISLO 1,3,4,6,7) (**GESLO 1,4,9,10)2. Exposure to the design theory and analysis of construction practices and systems(*ISLO 1,6,7) (**GESLO 1,2,3,4,9)3. Understanding of the utilization of available resources for construction planning, methods and materials (*ISLO 1,6,7)(**GESLO 1,4,9)4. Understanding, skill and knowledge of construction documents, communications, graphics, and surveying (*ISLO 1,2,3,4,6,7)(**GESLO 1,2,4,9)5. Skill and knowledge in construction estimating and bidding practices (*ISLO 1, 3, 6, 7) (**GESLO 1,3,4,9)6. Ability for planning and scheduling a construction project (*ISLO 1, 2, 3, 4,6, 7)(**GESLO 1,3,4,9,10)7. Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to construction management (*ISLO 1, 2, 3, 4, 6, 7) (**GESLO 1,3,4,9,10)

*ISLO – Institutional Student Learning Outcomes, can be located in the front of the catalog

** GESLO - General Education Student Learning Outcomes

C. Short Description

The Bachelor of Technology in Construction offers associate degree students, new students and skilled workers an educational route toward a career as a construction manager or supervisor. The 120-credit program combines knowledge in construction methods, planning and project management with business and supervisory skills. This program allows those who have completed an associate degree in construction technology to progress academically and earn a bachelor's degree. It also allows those already working in the construction field to enroll in an applicable baccalaureate degree program and expand career advancement possibilities. Approval has been granted to change the name of the program from a Bachelor of Technology to a Bachelor of Applied Science because of the concentration of applied processes associated with construction management.

This 120-credit program includes:

- 12-credits in Business and Management course requirements
- 60-credits in Construction course requirements
- 48-credits in General Education requirements

i. Unique Characteristics

The BT program at WNC holds several unique characteristics which include:

- It is the only four year construction management program offered in Northern Nevada.
- It is one of only two offered in the state, the other being at UNLV.
- The majority of the courses are scheduled late in the day to accommodate non-traditional students that work full time.
- It provides job placement to its graduates.
- Provides service opportunities to students both on and off campus.

ii. Concerns or Trends

Concerns: According to campus documents this program has never been reviewed or evaluated. Records indicate that there have been frequent turnovers in faculty and administrative leadership throughout the life of the program. Combined with the downturn in the construction industry starting in 2006, concerns have been generated about the sustainability of the program. Records indicate that scheduling semester courses varied from year to year and there was no guarantee that a student could progress through the program without delays or other obstacles that hindered their progress in a timely manner. Fortunately, all CTE programs (Career and Technical Education) have a new director whose prior assessment experience will help address these concerns.

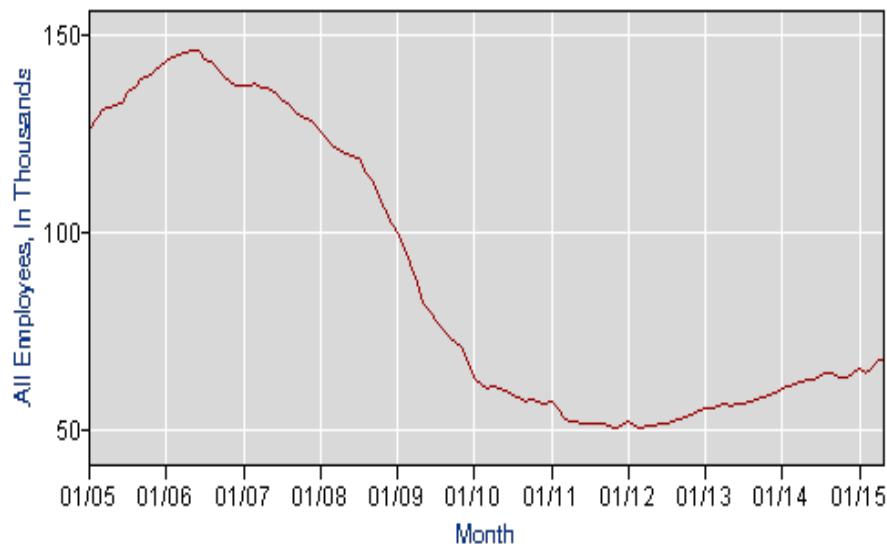
Employment Trends: CTE program areas, such as BTECH Construction Management, serve a specific employer and occupational need in the region. As such, enrollment fluxuations are expected to be consistent with the regional economy. This factor creates the need to take steps to maintain enrollment and deliver the program as efficiently as possible.

The chart below shows the State and Area Construction Employment trends over the past ten years. In 2006, the construction industry began a sharp decline and many construction companies were forced to release workers due to lack of contracts. Many workers were then retrained or worked in other industries. This generated a negative impact on enrollment and retention rates. The construction industry in Northern Nevada began a slow recovery in 2012, which accelerated in 2014 and continues upward. According to a study conducted by the Builders Alliance of Western Nevada (BAWN) there will be a potential shortage of competent construction workers in the future.

State and Area Employment, Hours, and Earnings: 2005 - 2015

Source: U.S. Bureau of Labor Statistics

Seasonally Adjusted
State: Nevada
Area: Statewide
Industry: Construction
Data Type: All Employees, In Thousands



iii. Significant Changes or Needs

There are significant changes that need to be made to the current BT program to fit the needs of the construction industry:

- Developing the AAS curriculum to fit the fundamental needs of students enrolling into the four year program.
- Increasing the number of relevant business and management courses required for the degree.
- The lack of relevant business courses required for the program.
- Eliminating duplicate courses and structuring the program requirements more towards management than engineering.
- Providing competent adjunct instructors in courses that previously were filled by individuals filling voids in the schedule without the necessary knowledge or skill sets to cover the subject matter in the correct way.
- Student learning outcomes need to be expanded to include leadership and team building and management requirements associated with construction management.
- Program student learning outcomes need to align with institutional and/or general education student learning outcomes.

D. Program Student Learning Outcomes 2010-2015

The following tables show the SLO by academic years from 2010 through 2015

Bachelor of Technology - CM											
2010-2011											
Student Learning Outcomes Matrix											
Upon completing the Construction Management program, students will be able to:											
Outcomes*											
1	Knowledge in basic economic principles, business principles and construction accounting, finances, and law										
2	Exposure to the design theory and analysis of construction practices and systems										
3	Understanding of the utilization of available resources for construction planning, methods and materials										
4	Understanding, skill and knowledge of construction documents, communications, graphics, and surveys										
5	Skill and knowledge in construction accounting, estimating and bidding practices										
6	Ability for planning and scheduling a construction project										
7	Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to CM										
Required Courses		Outcomes									
Course #	Name	1	2	3	4	5	6	7			
ACC 201	Financial Accounting	3									
ECON 102	Microeconomics	3									
ECON 103	Macroeconomics	3									
ECON 261	Statistics I	3									
MGT 323	Organizational Behavior							3			
MGT 367	HR Management							3			
AC 198B	HVAC		3				3				
BI 101B	Building Codes			3							
CADD 100	Computer Aided Drafting		3								
CEE 411	Environmental Law	1									
CEE 462	Construction Cost Estimating	3				3					
CEE 463	Project Scheduling			3	3	3	3				
CEE 464	Construction Law	3			3			2			
CEE 465	Construction Cost Accounting	3				3					
CEE 466	Construction Management	3	3	3	3	3	3	3			
CEE 495	Special Topics										
CONS 108B	Methods and Materials		2	3			3				
CONS 114B	Soils, sitework, concrete testing		2								
CONS 116B	Plumbing		2				3				
CONS 118B	Construction Contract Documents				3	2					
CONS 120B	Blueprint reading		3	2		3	3				
CONS 121B	Estimating	2		2	2	3	3				
CONS 205B	Site Safety		2	2	3			3			
CONS 216B	Structural Layout Assembly		3	3			2				
CONS 230B	Electrical Distribution		3	2			3				
CONS 281B	Planning and Scheduling		2	3	2	2	3				
CONS 351	Project Supervision	2	3	3	3	2	3	3			
CONS 451	Advanced Internship	3	3	3	3	3	3	3			
SUR 161	Surveying		2		3						

Assign a value to which each outcome is represented in each required class: 1 = slightly, 2 = moderately, 3 = significantly

* Outcomes must be measurable

Bachelor of Technology - CM**2011-2012****Student Learning Outcomes Matrix****Upon completing the Construction Management program, students will be able to:**

Outcomes*	
1	Knowledge in basic economic principles, business principles and construction accounting, finances, and law
2	Exposure to the design theory and analysis of construction practices and systems
3	Understanding of the utilization of available resources for construction planning, methods and materials
4	Understanding, skill and knowledge of construction documents, communications, graphics, and surveys
5	Skill and knowledge in construction accounting, estimating and bidding practices
6	Ability for planning and scheduling a construction project
7	Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to CM

Required Courses		Outcomes									
Course #	Name	1	2	3	4	5	6	7	8	9	10
ACC 201	Financial Accounting	3									
ECON 102	Microeconomics	3									
ECON 103	Macroeconomics	3									
ECON 261	Statistics I	3									
MGT 323	Organizational Behavior							3			
MGT 367	HR Management							3			
AC 198	HVAC		3				3				
BI 101	Building Codes			3							
CADD 100	Computer Aided Drafting		3								
CEE 411	Environmental Law	1									
CEE 462	Construction Cost Estimating	3				3					
CEE 463	Project Scheduling			3	3	3	3				
CEE 464	Construction Law	3			3			2			
CEE 465	Construction Cost Accounting	3				3					
CEE 466	Construction Management	3	3	3	3	3	3	3			
CEE 495	Special Topics										
CONS 108	Methods and Materials		2	3			3				
CONS 114	Soils,sitework,concrete testing		2								
CONS 116	Plumbing		2				3				
CONS 118	Construction Contract Documents				3	2					
CONS 120	Blueprint reading		3	2		3	3				
CONS 121	Estimating	2		2	2	3	3				
CONS 205	Site Safety		2	2	3			3			
CONS 216	Structural Layout Assembly		3	3			2				
CONS 230	Electrical Distribution		3	2			3				
CONS 281	Planning and Scheduling		2	3	2	2	3				
CONS 351	Project Supervision	2	3	3	3	2	3	3			
CONS 451	Advanced Internship	3	3	3	3	3	3	3			
SUR 161	Surveying		2		3						

Assign a value to which each outcome is represented in each required class: 1 = slightly, 2 = moderately, 3 = significantly

* **Outcomes must be measurable**

2012-2013
Bachelor of Technology - CM
Student Learning Outcomes Matrix

Upon completing the Construction Management program, students will be able to:

Outcomes*	
1	Knowledge in basic economic principles, business principles and construction accounting, finances, and law
2	Exposure to the design theory and analysis of construction practices and systems
3	Understanding of the utilization of available resources for construction planning, methods and materials
4	Understanding, skill and knowledge of construction documents, communications, graphics, and surveys
5	Skill and knowledge in construction accounting, estimating and bidding practices
6	Ability for planning and scheduling a construction project
7	Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to CM

Required Courses		Outcomes									
Course #	Name	1	2	3	4	5	6	7	8	9	10
ACC 201	Financial Accounting	3									
ECON 102	Microeconomics	3									
ECON 103	Macroeconomics	3									
ECON 261	Statistics I	3									
MGT 323	Organizational Behavior							3			
MGT 367	HR Management							3			
AC 198	HVAC		3				3				
BI 101	Building Codes			3							
CADD 100	Computer Aided Drafting		3								
CEE 411	Environmental Law	1									
CEE 462	Construction Cost Estimating	3				3					
CEE 463	Project Scheduling			3	3	3	3				
CEE 464	Construction Law	3			3			2			
CEE 465	Construction Cost Accounting	3				3					
CEE 466	Construction Management	3	3	3	3	3	3	3			
CEE 495	Special Topics										
CONS 108	Methods and Materials		2	3			3				
CONS 114	Soils, sitework, concrete testing		2								
CONS 116	Plumbing		2				3				
CONS 118	Construction Contract Documents				3	2					
CONS 120	Blueprint reading		3	2		3	3				
CONS 121	Estimating	2		2	2	3	3				
CONS 205	Site Safety		2	2	3			3			
CONS 216	Structural Layout Assembly		3	3			2				
CONS 230	Electrical Distribution		3	2			3				
CONS 281	Planning and Scheduling		2	3	2	2	3				
CONS 351	Project Supervision	2	3	3	3	2	3	3			
CONS 451	Advanced Internship	3	3	3	3	3	3	3			
SUR 161	Surveying		2		3						

Assign a value to which each outcome is represented in each required class: 1 = slightly, 2 = moderately, 3 = significantly

* Outcomes must be measurable

2013-2014
Bachelor of Technology - CM
Student Learning Outcomes Matrix

Upon completing the Construction Management program, students will be able to:

Outcomes*	
1	Knowledge in basic economic principles, business principles and construction accounting, finances, and law
2	Exposure to the design theory and analysis of construction practices and systems
3	Understanding of the utilization of available resources for construction planning, methods and materials
4	Understanding, skill and knowledge of construction documents, communications, graphics, and surveys
5	Skill and knowledge in construction accounting, estimating and bidding practices
6	Ability for planning and scheduling a construction project
7	Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to CM

Required Courses		Outcomes									
Course #	Name	1	2	3	4	5	6	7	8	9	10
BUS 101	Intro to Business	3						2			
ACC 201	Financial Accounting	3									
ECON 102	Microeconomics	3									
ECON 103	Macroeconomics	3									
ECON 261	Statistics I	3									
MGT 323	Organizational Behavior							3			
MGT 367	HR Management							3			
BI 101	Building Codes			3							
CADD 100	Computer Aided Drafting		3								
CEE 411	Environmental Law	1									
CEE 462	Construction Cost Estimating	3				3					
CEE 463	Project Scheduling			3	3	3	3				
CEE 464	Construction Law	3			3			2			
CEE 465	Construction Cost Accounting	3				3					
CEE 466	Construction Management	3	3	3	3	3	3	3			
CEE 495	Special Topics										
CEM 330	Soils and Foundations										
CONS 108	Methods and Materials		2	3			3				
CONS 114	Soils, sitework, concrete testing		2								
CONS 118	Construction Contract Documents				3	2					
CONS 121	Estimating	2		2	2	3	3				
CONS 205	Site Safety		2	2	3			3			
CONS 216	Structural Layout Assembly		3	3			2				
CONS 281	Planning and Scheduling		2	3	2	2	3				
CONS 351	Project Supervision	2	3	3	3	2	3	3			
CONS 451	Advanced Internship	3	3	3	3	3	3	3			
SUR 161	Surveying		2		3						
IS 101	Information Systems		2		2						
IS 201	Computer Applications			2	2						

Assign a value to which each outcome is represented in each required class: 1 = slightly, 2 = moderately, 3 = significantly

* Outcomes must be measurable

Bachelor of Technology - CM**Student Learning Outcomes Matrix**

Upon completing the Construction Management program, students will be able to:

Outcomes*	
1	Knowledge in basic economic principles, business principles and construction accounting, finances, and law
2	Exposure to the design theory and analysis of construction practices and systems
3	Understanding of the utilization of available resources for construction planning, methods and materials
4	Understanding, skill and knowledge of construction documents, communications, graphics, and surveys
5	Skill and knowledge in construction accounting, estimating and bidding practices
6	Ability for planning and scheduling a construction project
7	Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to CM

Required Courses		Outcomes									
Course #	Name	1	2	3	4	5	6	7	8	9	10
BUS 101	Intro to Business	3						2			
ACC 201	Financial Accounting	3									
ECON 102	Microeconomics	3									
ECON 103	Macroeconomics	3									
ECON 261	Statistics I	3									
MGT 323	Organizational Behavior							3			
MGT 367	HR Management							3			
BI 101	Building Codes			3							
CADD 100	Computer Aided Drafting		3								
CEE 411	Environmental Law	1									
CEE 462	Construction Cost Estimating	3				3					
CEE 463	Project Scheduling			3	3	3	3				
CEE 464	Construction Law	3			3			2			
CEE 465	Construction Cost Accounting	3				3					
CEE 466	Construction Management	3	3	3	3	3	3	3			
CEE 495	Special Topics										
CEM 330	Soils and Foundations										
CONS 108	Methods and Materials		2	3			3				
CONS 114	Soils, sitework, concrete testing		2								
CONS 118	Construction Contract Documents				3	2					
CONS 121	Estimating	2		2	2	3	3				
CONS 205	Site Safety		2	2	3			3			
CONS 216	Structural Layout Assembly		3	3			2				
CONS 281	Planning and Scheduling		2	3	2	2	3				
CONS 351	Project Supervision	2	3	3	3	2	3	3			
CONS 451	Advanced Internship	3	3	3	3	3	3	3			
SUR 161	Surveying		2		3						
IS 101	Information Systems		2		2						
IS 201	Computer Applications			2	2						

Assign a value to which each outcome is represented in each required class: 1 = slightly, 2 = moderately, 3 = significantly

* Outcomes must be measurable

E. Degrees or Certificates Offered:

- Bachelor of Technology – Construction Management
- 30 hour OSHA Safety card

F. Niches Served:

- Community and campus service projects
- Play set design and construction for the Western Nevada Theatre Company
- Active involvement in area High School CTE programs
- Engagement with professional construction organizations

2. Quality of Program

The Bachelor of Technology – Construction Management program has produced approximately 40 graduates that are currently employed in construction related careers across the country (based on informal follow up data). In the past, the curriculum was saturated with fundamental trade skill curriculum that only allowed students to learn the specifics related to the trade; not how to manage that trade. Since the fall 2014 semester, steps have been taken to re-develop the current two year AAS – Construction Technology program towards becoming a strong foundation for the four year degree. Students will learn the work breakdown structures of each milestone activity of a commercial construction project plus problem solving and critical thinking processes associated with the uniqueness of each site. Additional changes are expected in the current four year curriculum that will enhance the total learning experience towards construction management. These changes will match or exceed what are offered at other schools that offer two and four year construction related degrees and certificates.

Currently, the faculty involved in the construction program are developing online course work that will offer students the flexibility to either complete course work on-line or in-class. Providing a 21st Century approach to learning should benefit the students that are seeking an education but live in rural areas of the state. Unlike most four year programs at major universities, WNC wants to target non-traditional students that are currently working in the construction industry and want to enhance their advancement opportunities or those that have found themselves in a career that has grown stagnant or obsolete and want to enter into a new career.

A. Evidence of Effectiveness

i. Course Scheduling/Enrollment History Report:

The 4 year course history for the BTECH Construction Management is summarized in the table below. An analysis of the table shows:

- Selected courses offered twice per academic year, as opposed to once, ran with low enrollment.
- Spring 2015 semester total student count averages 73% higher than each of the three previous semesters.
- Spring 2015 total student count in CONS 451: Internship in Construction is 40% higher than the three previous semesters combined.

The full Course Scheduling Matrix is shown in Attachment A.

BTECH Course History										
Prefix	Title	Fall 2011	Spr 2012	Fall 2012	Spr 2013	Fall 2013	Spr 2014	Fall 2014	SP 2015 prelim	Total student per course (over 4 academic years)
CONS 451	Adv Internship in Const		7	4	4	2	2	1	7	27
CEE 463	Project Scheduling		5		9	2	4	4	2	26
CEE 466	Construction Mgmt.		2	6		3	7		4	22
CEE 465	Const Cost Accounting	7		7	2	3		8		27
CEM 456	Cons Mgt Capstone		4		9		2		3	18
CEE 462	Const Cost Estimating		9		4		5	7	3	28
CEM 330	Soils and Found. for Cons					8			5	13
CEE 464	Construction Law		12			3	6		6	27
CONS 351	Adv Project Supervision	8		7		8		5		28
CEE 495	Special Topics		6		9				10	25
CEE 411	Environmental Law	16	5	8					6	35
Total student count per semester		31	50	32	37	29	26	25	46	

ii. **Summary Data -**

Summary Data Worksheets generated by IR are no longer available.

Enrolled by Major and Semester: The chart below represents the summary numbers for students in the declared BTECH major by semester.

Description	Fall 2011	Spr 2012	Fall 2012	Spr 2013	Fall 2013	Spr 2014	Fall 2014
Number Students declared BTECH major	49	49	33	39	42	32	32

WNC Awards: The BTECH Construction Management program represents a small percentage (1.5%) of the total graduates (2010-2014). Per the chart below, this percent is comparable to the awards granted in Associate level CTE programs. It is currently the only Bachelor level program offered by WNC.

DEGREE	DESCRIPTION	CIP_CODE	2010	2011	2012	2013	2014	Totals	Percent of Total
	Total Awards (all programs)		474	494	495	522	564	2,549	
AAS	Construction Project Mgt.	46.0499	13	5	3	5	3	29	
AAS	Technology - Construction	46.0415	0	0	0	0	1	1	
Subtotal AAS level Construction								30	1.2%
BT	BTECH Construction Mgmt.	46.0412	6	11	5	4	11	37	1.5%
AAS	Machine Tool Technology	48.0501	5	3	4	5	5	22	
AAS	Technology - Machine Tool	48.0501	0	0	0	0	1	1	
CT	Machine Tool Technology Cert	48.0501	1	3	2	0	1	7	
Subtotal AAS level Machine Tool Programs								30	1.2%
AAS	Technology - Welding	48.0508	0	0	0	0	1	1	
AAS	Welding Technology	48.0508	3	0	1	2	1	7	
Subtotal AAS level Welding Programs								8	0.3%

Course Completion: The chart below shows the success rate for BTECH courses for a five year period from 2009-2014. An analysis of this chart shows:

- Course completion rates average 93% across five years
- Course completion rates dipped below the five year institutional average of 82% in only 3 of 45 sections
- 64% of sections across the five years had 100% completion

WNC Course Success Rates by Academic Year								
(Total students with C- and above, P, or S grades/total enrolled after removing audits, incompletes and missing grades. Must have at least a total of 10 students enrolled.)								
Subject	Catalog No	Title	2009-10	2010-11	2011-12	2012-13	2013-14	Total Enrolled
CEE	411	Environmental Law	62.5		85.7	75.0		45
CEE	462	Const Cost Estimating	92.9	91.7	66.7	100.0	100.0	44
CEE	463	Project Scheduling	100.0	100.0	80.0	100.0	100.0	37
CEE	464	Construction Law	100.0		100.0		100.0	33
CEE	465	Const Cost Accounting	100.0	83.3	100.0	88.9	100.0	38
CEE	466	Construction Management	100.0	100.0	100.0	100.0	80.0	38
CEE	495	Special Topics	100.0	57.1	83.3	100.0		29
CEM	456	Cons Mgt Capstone	100.0	87.5	100.0	100.0	100.0	35
CONS	351	Adv Project Supervision	100.0	100.0	100.0	85.7	87.5	37
CONS	451	Adv Internship in Const	100.0	100.0	71.4	100.0	100.0	34

iii. Systematic Assessment

There is no current history available concerning assessment associated with this program. The Institutional Research department provided data relating to enrollment and completion in a limited capacity. Some minor changes to required courses have been made prior to the fall 2014 semester but no effort was placed in developing a specific review and assessment process. Student Learning Outcomes, course requirements, and course sequencing are being addressed and will be updated by the fall 2016 semester with a yearly assessment process in place.

B. Evidence of Satisfaction

Currently, the Institutional Research department has not been able to provide hard data that provides evidence of student satisfaction. Course evaluations cannot be easily tabulated due to the process in which they are prepared and filed. It should be noted that the writer of this review was told by both students and industry partners that the program is currently implementing the necessary changes that should be competitive to other programs across the country. Course evaluation data is now being retained for future reports.

C. Certifications/Licenses

Currently there are two certifications offered through this program. OSHA Safety and Residential Inspection training is available with the OSHA training being mandatory in the core requirements of the degree. The construction industry requires the 10 hour training for the skills trade workers and the 30 hour training is required for supervisory or management workers.

In the future the program may offer Basic Crew Leader and Supervisory certifications through the National Center for Construction Education and Research (NCCER) a process that will enhance the employability skills for our graduates.

D. Enrollment Trends

- a. What student demographic and enrollment trends are most notable? *See Attachment B – Course Completion Rates 2010-2014.* According to the data provided by Institutional Research in the years 2011-2012, 2012-2013 female enrollment increased by 11% and increased another 16% between years 2012-2013, 2013-2014.
- b. What groups constitute the program's main demographic? *See Attachment B – Course Completion Rates 2010-2014.* According to the data white students make up 71% of the program enrollment with 85-90% total enrollment being male.
- c. What efforts have been made by the program to recruit students? The following procedures have been implemented starting fall 2014:
 - Established an active construction industry advisory board that provides guidance and internship opportunities
 - Conducted community service projects that were promoted in local news papers
 - Developed a construction academy for area high school students interested in construction careers using the NCCER process
 - Developed a structured course schedule that is constant and does not conflict with other required courses
 - Established relationships with local workforce development organizations
 - Participate in area career fairs
 - Engage construction industry organizations and participate in their workforce development opportunities
 - Established relationships with other two year colleges through strong articulation agreements

d. What initiatives have been undertaken to increase FTE?

The program is currently developing online courses in both the two year and four year programs for student convenience. The majority of courses are scheduled late in the afternoon or evening to allow students working full time to participate. Adjunct instructors must hold specific qualifications and experience before being allowed to instruct courses and office hours are required to provide struggling students an opportunity to address their concerns or problems with the course. To expand program opportunities courses are now being offered through the IAV technology to the Fallon campus.

The initiatives described above should generate more FTE in the future. The trend to increased enrollment coincides with industry demand. According to the Bureau of Labor Statistics the state of Nevada is currently experiencing a rise in demand for competent and qualified construction workers. According to past data, enrollment increases with an improved economy.

e. What initiatives have been undertaken to improve student retention?

The following initiatives have been undertaken to improve student retention:

- Established a set course schedule
- Established a direct link to internship opportunities through the program's advisory board
- Provide competent and qualified instructors
- Provide updated technology that is currently used in the industry
- Introduced project based learning into all curriculum

The initiatives listed above should improve student retention in the BT program. According to the enrollment data provided by Institutional Research there were semesters where only a few required courses were offered. This extends the time it takes to complete the degree plan thus creating a loss of interest. The added convenience of having internship opportunities in house removes barriers that are present when applying for work off the street. In the past adjunct positions were filled with anyone interested in helping even if their qualifications did not match the content of the course which generates a lack of interest in students. Finally, with the introduction of project based learning the students get to experience real world applications and processes that take the lessons learned through lecture and apply them to real world scenarios.

E. Need for the Program

According to the Bureau of Labor Statistics Data (graphic pg. 6) the demand for construction workers in Northern Nevada has been slowly increasing each year since January, 2012. The Bachelor's Degree here at WNC provides the necessary qualifications to satisfy the base or fundamental criteria for any entry level construction management position across the nation. Once the curriculum is completely developed online it will fill an additional need for those that currently work in the construction industry but live in rural areas of the state.

Currently there are only two four year programs in construction management offered in the state. Here at WNC and the other being UNLV. With the increased demand from the industry the

need for this particular program increases with every building permit awarded for new construction projects. The program receives requests from the industry for interns every week. Fortunately at the time of this report the majority of the students enrolled in the program are working and receiving on-the-job training from our industry partners.

The detailed analysis of the data indicates the primary areas for improvement are increasing course enrollment and efficiency of delivery (scheduling). Several initiatives towards those goals have been explored since the new program instructor started in fall 2014. Some efforts have not launched and it will be one to three years before the BTECH program can expect to see impact. Efforts include:

1. BTECH was designed to be a continuation of the AAS Construction Management program. Efforts made to increase enrollment and completion at the Associate level should cultivate growth in the Bachelors program. For the Fall 2015 semester, a Construction Management Academy and concentrated K-12 recruiting is underway.
2. Agreements with TMCC for a 2+2 program with AAS graduates are being developed
3. A partnership with UNLV is being explored to accommodate some of the needs for both programs.
4. Credit for Prior Learning is being considered with CLEP testing opportunities.
5. Experiential Credit up to 15 credits with verifiable related work history.
6. Outreach to construction employers for internships, placements and recruitment of incumbent workers.
7. Conversion of instructor led courses to on-line delivery should expand the pool of potential students by reaching working adults and students in rural areas.
8. Construction focused marketing efforts which include local career fairs, industry events, and high school campus visits.

F. Curriculum Review Report:

See Attachment C

G. Findings and Recommendations

1. One of the major problems the reviewers determined after reviewing the data was that there needs to be a standard eight semester course schedule that would allow students to complete the program in a timely manner. Records show that some courses were repeated semester to semester, some courses were not offered or available to students which makes it difficult to complete the program in a timely manner. Now that all the necessary course changes have been either approved or are waiting approval a set eight semester plan will be presented in the 2016-2017 catalog. Students will be able to complete the program requirements in a four year span if they choose to do so.

2. After reviewing the necessary data required to develop a program review some changes need to be made in the record keeping and data collection processes. In the future the construction department will be establishing set in house type of student and program evaluations to provide additional data that could not be located during the review process. We understand that the campus has recently addressed this problem but our program is the only four year program being offered so we need some additional data that others may not deem necessary or relevant.
3. Another problem that was recognizable was the lack of continuity between the course requirements for the two year program and those required for the four year degree. With the assistance from the programs advisory board members, external educators from other Nevada college programs, and the faculty and staff from WNC the two year program is now considered a strong foundation for those students interested in continuing into the four year program. The additional changes to the four year degree have been developed and submitted and will align towards more management fundamentals than trade skills.
4. To increase interest and enrollment in the current program there needs to be an established marketing plan. The campus needs to be spreading the word about CTE opportunities every week not just every now and then when special events or activities are being offered. Preferably an annual marketing plan should be prepared with the involvement of the marketing department, CTE Director and the related faculty and staff associated with the individual programs.
5. Another weakness the reviewers discovered was the low enrollment numbers throughout the programs history. There could be several reasons that could be discussed relating to the lack of interest in the program but the reviewers decided on focusing on the future not the past. The only way this program will survive in the future is to generate more interest in it. Some of the ways the current faculty and staff have initiated change is establishing a strong partnership with various industry related professional organizations. These new relationships generated interest from their related members to become a part of the program's advisory board. The new partners understand that we are here to support their workforce needs and listen to their concerns and make the necessary changes to improve the curriculum to address those concerns. The program also has a new pathway that once implemented should generate more interest. Recently, a "C" track Jumpstart program was developed to entice local high school students and others in the community an opportunity to earn dual credits and national certifications upon completion. The academy is tied directly to the two year program so if we can get the numbers up in the academy program logic suggest interest will increase in the other programs.

External Reviewer

March 4th, 2016

External Reviewer:

Randy Walden
Director- Applied Industrial Technologies
Truckee Meadows Community College
Licensed Residential Builder – State of Michigan

Program:

Construction Management – Bachelor of Technology

Program Strengths:

The Bachelor of Technology in Construction Management program has several strengths, including instructor knowledge and commitment to improvement, as well as student success.

1. Lead faculty, Mr. Robert Ford, brings both academic and real-world experience to the program. On the academic side, the curriculum has been brought up-to-date, course scheduling revised and several courses developed for on-line delivery.
2. During his program improvements, Mr. Ford has worked in partnership with Truckee Meadows Community College faculty and leadership to ensure the current transfer agreement remained intact.
3. After taking over the program, Robert quickly established relationships with employers, industry organizations and other NSHE colleges for articulation and common course numbering. This program has solid alignment to regional employers' needs and national certifications. Through improvements in community involvement with area construction companies, students from the program have seen opportunities expand for employment

Program Weaknesses:

The weaknesses of the program primarily fall in areas outside of the control of the instructor. Like manufacturing, construction can be perceived as dirty, physical work that is subject to seasonal downturn and economic influences. As a result, the program has difficulty recruiting students.

Program Opportunities:

1. More support should be given for outreach and recruitment activities.
2. Promote the program as a management degree with an emphasis in construction rather than a construction degree with management courses.
3. Continue working with area employers to develop additional internship opportunities.
4. Work with employers and industry organizations to promote Construction Management as a well-paying, in-demand occupation.
5. Research the benefits, requirements and costs of becoming an NCCER Accredited provider.

Internal Reviewer

MEMO

To: PARC
From: Georgia White, Internal Reviewer
Subject: Construction Management, B-Tech Program Review
Date: November 23, 2015

The major question facing the construction area when writing the review was whether to write the report based on the past five years or reflect on the changes that occurred over the past few months. Given the purpose of the review, the decision was made to cover the past five years knowing the report would reflect issues with previous program.

During the past few months, the construction faculty worked to align curriculum with the degree intent (construction management) and with industry standards. Significant effort placed in communication with national leaders and Nevada construction programs. A comprehensive capstone course was developed. All of the curricular changes have been made. A Jump Start focused, one-year academy was designed ready for implementation.

The faculty developed a great program over the past year. The next step is to implement the academy and build a pipeline of students into the four-year program. Some publicity around the program took place this fall. Continually supplying WNC's Marketing and Communication area with marketing ideas and student profiles will keep the construction program in the forefront of individuals in our service area.

Student comments praised the new program and the faculty. A couple of students transitioned from the old to the new program adding credibility to changes. Curricular changes were designed to meet industry needs. A distance education component was added to make the program accessible.

Strengths of the program:

- Well-designed curriculum is set
- One-year academy for Jump Start and technical instruction is in place
- Several nationally recognized certifications available to students
- Articulation from other colleges is seamless
- Faculty expertise

Weaknesses of the program:

- Low enrollment history
- Recruitment effort
- Overcoming the negative mindset associated with construction in an economic downturn

Recommendations:

1. Align program goals and SLOs with the industry needs. While curriculum aligns with industry needs, the goals of the program and the Student Learning Objectives need to reflect this alignment. These were probably in the mindset of faculty when developing

the curriculum. They need to be specifically identified and written down including measurements of success and a time line for achievement.

2. Ensure employability skills are incorporated into the classes.
3. Identify 12 hr. certificates to establish stepping stones as students move through AAS and BAS degree.
4. Identify comparable/peer institutions for comparison of enrollment trends, curriculum, and outcomes.
5. Continue working with Construction Advisory Board for industry feedback and needs.
6. Establish method for tracking graduates. Follow employment/placement and to gather feedback on program.

Attachment A – BTECH Course History Report

[illegible]

CARSON	CEE 465	Const Cost Accounting	7	0	0	0	0	0	0	0	0	0	0	7
CARSON	CEE 465	Const Cost Accounting	0	0	0	7	0	0	0	0	0	0	0	7
CARSON	CEE 465	Const Cost Accounting	0	0	0	0	2	0	0	0	0	0	0	2
CARSON	CEE 466	Construction Management	0	0	0	0	0	0	0	0	0	0	4	4
CARSON	CEE 466	Construction Management	0	0	0	0	0	0	0	7	0	0	0	7
CARSON	CEE 466	Construction Management	0	2	0	0	0	0	0	0	0	0	0	2
CARSON	CEE 466	Construction Management	0	0	0	6	0	0	3	0	0	0	0	9
CARSON	CEE 495	Special Topics	0	0	0	0	9	0	0	0	0	0	0	9
CARSON	CEE 495	Special Topics	0	6	0	0	0	0	0	0	0	0	0	6
WEB	CEE 495	Special Topics	0	0	0	0	0	0	0	0	0	0	10	10
CARSON	CEM 330	Soils and Foundations for Cons	0	0	0	0	0	0	8	0	0	0	0	8
CARSON	CEM 330	Soils and Foundations for Cons	0	0	0	0	0	0	0	0	0	0	5	5
CARSON	CEM 456	Cons Mgt Capstone	0	4	0	0	0	0	0	0	0	0	0	4
CARSON	CEM 456	Cons Mgt Capstone	0	0	0	0	9	0	0	0	0	0	0	9
CARSON	CEM 456	Cons Mgt Capstone	0	0	0	0	0	0	0	2	0	0	0	2
CARSON	CEM 456	Cons Mgt Capstone	0	0	0	0	0	0	0	0	0	0	3	3
CARSON	CONS 351	Adv Project Supervision	0	0	0	7	0	0	0	0	0	0	0	7
CARSON	CONS 351	Adv Project Supervision	0	0	0	0	0	0	0	0	0	5	0	5
CARSON	CONS 351	Adv Project Supervision	8	0	0	0	0	0	0	0	0	0	0	8
CARSON	CONS 351	Adv Project Supervision	0	0	0	0	0	0	8	0	0	0	0	8
CARSON	CONS 451	Adv Internship in Const	0	7	0	4	4	0	2	2	0	1	7	27

Attachment B – Course Completion Rates 2010-2014

WNC Course Success Rates - Five Years for Women, Men, Minority, and Non-minority Students							
(Total students with C- and above, P, or S grades/total enrolled after removing audits, incompletes and missing grades. Must have at least a total of 10 students enrolled.)							
Subject	Catalog No	Title	Women	Men	Minority	Non-minority	Total_Enrolled
CEE	411	Environmental Law	71.4	76.3	60.0	77.5	45
CEE	462	Const Cost Estimating	80.0	89.7	80.0	89.7	44
CEE	463	Project Scheduling	100.0	97.1	100.0	96.9	37
CEE	464	Construction Law	100.0	100.0	100.0	100.0	33
CEE	465	Const Cost Accounting	100.0	93.9	80.0	97.0	38
CEE	466	Construction Management	100.0	93.9	83.3	96.9	38
CEE	495	Special Topics	100.0	84.6	100.0	84.6	29
CEM	456	Cons Mgt Capstone	100.0	96.9	100.0	96.7	35
CONS	351	Adv Project Supervision	100.0	94.1	80.0	96.9	37
CONS	451	Adv Internship in Const	100.0	93.5	75.0	96.7	34

Attachment C – Curriculum Review Report

Curriculum Review Report

Bachelor of Technology

Fall 2015

- 1) Mission Statement - The mission of the Bachelor of Technology degree in Construction Management is to prepare students for entry level and mid-level positions within the various construction industry disciplines, and to meet the goals of the Technology Division.

Student Learning Outcomes:

- Knowledge in basic economic principals, business principals and construction accounting, finances, and law
 - Exposure to the design theory and analysis of construction practices and systems
 - Understanding of the utilization of available resources for construction planning, methods and materials
 - Understanding, skill and knowledge of construction documents, communications, graphics, and surveying
 - Skill and knowledge in construction estimating and bidding practices
 - Ability for planning and scheduling a construction project
 - Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to construction management
- 2) Since the fall 2010 semester there were limited changes made to the original curriculum developed when the program was implemented. The majority of the lower level 100 and 200 courses were focused on trade skills that did not provide the necessary management instruction to prepare those students interested in continuing into the four year degree. The four year degree curriculum was a combination of civil engineering and construction management courses that when combined did not provide the necessary management instruction to provide the students the necessary fundamental knowledge to excel in a construction management career. Since the turn of the century the construction industry has changed drastically becoming more technology focused and management based. Compared to programs across the country it is apparent changes are necessary before this curriculum will satisfy the current management needs of the industry.
 - 3) According to the data received from Institutional Research a clear sequence of course offerings has not been maintained. Students have been allowed to enroll in any course that fit their schedules even if pre-requisites were not met. Low enrollment numbers could be to blame but one apparent problem is the lack of planning by past faculty or administrators. It is very important to provide students a structured sequence of course offerings so they can develop a path through the curriculum that allows them to complete the requirements in a timely manner. The faculty are in the process of developing a set of sequenced course offerings that will allow the students to follow prerequisite requirements. This should build cohesion between course offerings and allow completion of the degree on time.
 - 4) There is no evidence that courses have been scheduled in a manner that allows students to complete the program in a timely manner. According to the data provided by Institutional Research courses were offered in a random fashion. The faculty related to the program are in the process of developing an eight semester schedule that will be locked into place in fall 2016. Currently, the course requirements are being changed to meet the

needs of the accreditation process and after the changes are adopted the program will follow a set schedule that will benefit students and hopefully enhance retention rates.

- 5) There is no history available concerning any formal review process for required or recommended courses related to this program.
- 6) There is no history available concerning any formal review of the general requirements associated with this program.
- 7) The catalog information associated with this program has only changed when new courses were added to the requirements. The current 2015-2016 catalog includes the lower level 100-200 course changes approved fall 2014. The faculty associated with this program is in the process of completing the necessary course changes to meet accreditation requirements and will be identified in the 2016-2017 catalog. See catalog for course outlines.
- 8) Although a requirement for course syllabi, there is no evidence of a programmatic focus on information literacy at this time. The library provides a huge selection of old text books, industry related videos and other resources that can provide students additional learning opportunities when necessary.

Attachment D – One Year Assessment Plan

Academic Year:	2015 - 2016
Academic Program:	BT- Construction Management
Academic Program Division:	CTE
Program Responsible Person:	Robert Ford
Assessment Team Member/s:	Barbara Walden, Georgia White, Nigel Harrison
Date Submitted:	10/23/2015
College Mission:	Western Nevada College inspires success in our community through opportunities that cultivate creativity, intellectual growth and technological excellence, in an environment that nurtures individual potential and respects differences.
College Strategic Plan Goals:	Students completing degrees at WNC need to demonstrate a combination of intellectual skills, personal and social responsibility, and the ability to integrate knowledge and skills to understand and solve contemporary and enduring problems
Division Mission:	The purpose of the Associate of Applied Science degree is to provide employment-related knowledge and skills necessary to succeed in a chosen field of study
Program Mission:	The mission of the BT degree in construction management is to prepare students for entry level and mid-level positions within the various construction industry disciplines, and to meet the goals of the Technology Division

This form allows all groups engaged in the on-going assessment process at WNC to document their assessment plan. Those responsible for annual assessment of academic programs are required to complete an assessment of at least one program outcome or student learning outcome each year but may assess more than one outcome if they choose. (Copy and paste the tables if more than one outcome is assessed.)

Refer to the 2012-2018 WNC Strategic Plan to determine appropriate strategic plan goals with which program goals align. (http://www.wnc.edu/files/departments/institutional/wnc_strategic_plan_-_final.pdf)

Completed annual assessments and 5 year assessment plans are to be submitted electronically to Institutional Research and division directors by the conclusion of spring semester each year.

Program Goal:	Prepare students for entry level management positions in construction
Outcome:	Application of relevant administrative skills, ethics, safety practices, and problem solving techniques to construction management
Assessment Methods and Criteria for Success:	A capstone course was developed to test a student's learning through a project based learning process that satisfied the program's Industry Advisory Board members. Students will be expected to develop and present a standard bid package to a panel of faculty, staff and advisory board members. A rubric will be used to determine the outcomes of the project.
Planned Use of Results and Future Assessment Year:	Results will be evaluated to determine if adjustments need to be made to the student learning outcomes for their general requirements and other subject matter related to the degree requirements.

Attachment E – Five Year Action Plan

List the **Recommendations** from the **Internal Reviewers**, **External Reviewers**, and the **Program Review Team** in relation to the **Program Goals**.

The **Review Team Response (Action Plan)** states how program faculty and staff plan to act on the recommendations.

The **Administrative Response** can state agreement or disagreement with the proposed actions or suggest changes to the action plan.

Program Goals	Recommendations from: <ul style="list-style-type: none"> Internal Reviewers [I] External Reviewers [E] Program Review Team [T] PARC [P] 	Program Review Team Response (Action Plan)	Administrative Response
Align curriculum with national accreditation standards provided by Associated Schools of Construction (ASC)	T, I	Changes to the curriculum were approved Fall 2015 and will be presented in the new catalog	
Provide competent adjunct instructors	T	Adjuncts have been placed in specific courses that require subject matter experts to provide instruction	
Creating web-enhanced curriculum	T	Robert Ford has received the necessary Canvas Training to develop Quality Matters based online course work.	
Establish an eight semester curriculum plan	T	Plan has been developed and approved and will be implemented starting Fall 2016	
Create method to monitor student degree progress	T	Data will be collected starting in the Fall 2016 semester. Instructors will be more involved in the registering process	
Articulation from other colleges is seamless	T, I, E	Articulation agreements are in place with Nevada institutions	
Create active student cohort	T	By-laws and other related documents are being developed to submit to student services for approval	

Establish method for tracking graduates	T, I	A data collection process will be developed by the new administrative assistant	
Develop potential feeder programs for the BAS degree	T	There are two potential feeder programs, Gateway and Ramsdell Academy both offer Certificates of Completion as well as National certifications	

Signature, Dean of Instruction

Date

Signature, VP Academic & Student Affairs

Date

Signature, President

Date

Attachment F – Five Year Assessment Plan

Program Name: Bachelor of Applied Science – Construction Management

Submission Date: 03/18/2016

List the program outcomes and/or student learning outcomes and briefly describe the means of assessment for each one. Insert an “X” in the column of each year the outcome will be assessed.

Outcomes	Year 1	Year 2	Year 3	Year 4	Year 5	Means of Assessment
Year	2015	2016	2017	2018	2019	
CEM 100 – Pre-test student’s fundamental knowledge of the construction management process based on the program’s learning objectives.	X	X	X	X		Students will be given a multiple choice exam with 50 questions relating to the program’s student learning outcomes related to the construction industry ISLO 2,3,6 PLO 4,5,6,7
CONS 291 – Post-test student’s fundamental knowledge of the construction management process based on the program’s learning objectives.		X	X	X	X	Students will be given the same exam as given in CEM 100. Scores can be compared to determine a learning curve associated with SLO ISLO 1,2,3,4,6,7 PLO 1,2,3,4,5,6,7
CEM 456 – Post-test of all the required SLO associated with the four year degree including general studies, business, and management and construction courses.	X	X	X	X	X	Students are assigned a bid process project that follows the general requirements of an actual bid package. Learning will be measured based on realistic industry expectations, project presentation, and verifiable research content by the advisory board members ISLO 1,2,3,4,6,7 PLO 1,2,3,4,5,6,7

* Capstone – The capstone course requires students to combine all the student learning outcomes associated with all the required courses. They must develop a business plan, review drawings and complete an estimate and schedule for those drawings, determine contract, bonding and insurance requirements, then prepare a professional presentation to present their bid package to a group of advisory members.

** The Construction Gateway, Ramsdell Academy and AAS programs should be considered potential feeders for the BAS degree