



INFORMATION FOR THE PUBLIC

Construction Technology & Management Programs
Ferris State University
August 2021

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STUDENT PLACEMENT UPON GRADUATION

Academic Year	Number of Graduates	Average Base Salary*	Placement (within 3 months of graduation)
2014 - 2015	38	\$50,576.00	100%
2015 - 2016	54	\$55,000.00	100%
2016 - 2017	48	\$56,500.00	100%
2017 - 2018	56	\$55,592.00	100%
2018 - 2019	57	\$60,000.00	100%
2019 - 2020	60	\$60,000.00	100%
2020 - 2021	48	\$63,000.00	100%

* Includes those willing to share their placement information. Base salary does not include any benefits, bonuses, etc.

Recent Employers of Our Students

CTMG Employers

Typical Types of Employers:	Job Titles At Hiring
Construction Management	Project Engineer Assistant Superintendent Assistant Project Manager
General Contractors	
Construction Management and General Contracting	
Specialty Contractors	
Civil Contractors	
Residential	
Land Development	
Department of Transportation	
Road Commission	

PROGRAM PHILOSOPHY

The Program's teaching philosophy is in alignment with that of Ferris State University. Ferris State University was founded on the belief that all students should have the opportunity to obtain a college education that will allow them to pursue a career. In addition to providing solid technical training, our founder insisted that "no matter how technically trained they be, students should have a good working knowledge of English." (Today, these "English branches" that were offered would be considered "Liberal Arts") This has expanded to Ferris State University's belief that its students should have a well-rounded education to prepare them to be responsible citizens.

Our degree includes a solid technical education in construction topics, complemented by general education courses required of a Bachelor of Science degree program. Our teaching philosophy is that real world experience can help bring theory into practice for students. Our students "learn by doing." Thus the majority of our courses in the first two years of study have a lab component. This provides opportunity for students to practice what they learn in lecture. Lab activities are intended to mimic what occurs in industry in the real world. This strong technical knowledge is brought together in a student's second two years in the program where they learn how to manage that technical knowledge in the construction industry.

Ferris State University's focus is on teaching. Research is not a requirement, but dedication to teaching is paramount. Thus, a doctoral degree is not necessary for teaching in our Bachelor degree program, but real world experience that supplements a Master's degree is required. In our Program's case, all faculty have a minimum of 5 years full-time US construction industry experience.

PROGRAM MISSION

The mission of the Construction Technology and Management Program is to educate students in Building Construction Technology, Civil Engineering Technology – Highway focus, and Construction Management through a broadly based foundation of applicable technical and general education courses that will provide them with highly competitive skills and knowledge, construction-related employment opportunities at graduation, and the potential for advancement in their careers

The Program is focused on three major themes of Transformative Educational Experience, Excellence and Opportunity, and Enrollment to ensure it meets the mission's two primary objectives of serving students and serving the industry.

1. Maintain a high quality curriculum content by meeting its accrediting body's Student Learning Outcomes
2. Maintain accreditation of the BS Construction Management by the American Council for Construction Education
3. Serve the employment criterion for the construction industry
4. Assist students in acquiring construction related summer employment and employment experiences
5. Assist graduates in finding construction related employment upon graduation
6. Develop professionalism in the students through multiple opportunities
7. Ensure excellence in teaching through a well-staffed and well-qualified faculty
8. Provide experiential learning and teamwork application opportunities

PROGRAM LEARNING OUTCOMES

The Program has one Learning Outcome: Meet all ACCE (American Council for Construction Education) Student Learning Outcomes. The 20 SLOs were developed with industry input, thus ensuring that the Program is serving the industry. Meeting the SLOs provides a consistency of what can be expected in a Bachelor of Science in Construction Management degree from an ACCE-accredited program so that students can compare different programs.

Per ACCE, a graduate shall be able to:

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

ADMISSIONS PROCESS AND STANDARDS

The general admission standards to FSU are a cumulative 2.25 GPA and an 18 composite score on the ACT or a 950 composite on the SAT. The admission standards of the Program are a preferred 2.75 GPA and the minimum math is an SAT math score of 500 or an ACT math score of 19. Higher scores in math are solid indicators of greater success in the program and ultimately after graduation. This is apparent as early in the Program as CONM 116 Construction Graphics.

Students desiring the program but lacking either the GPA or test scores are admitted to the University's General Studies program while they complete any necessary remedial courses or earn a college GPA of 2.0 with 12 credits. Once they have achieved this, they may be admitted to the Program.

Additionally, for entry to the 300 and 400 level CONM courses (which complete the Bachelor degree), the Program requires that students have an overall GPA of 2.5 and have completed their Associate's degree (AAS BCTM, AAS CETH, or AAS AT). That includes all 100 and 200 level CONM and all BCTM/CETM/ARCH courses required of the AAS degree, Physics, (2) English classes, and potentially a Trigonometry course (unless the student had already completed higher level math with an Advanced Placement test or had placed into higher level math with their ACT/SAT test scores).

STUDENT ORGANIZATIONS

Students have the opportunity to participate in many Registered Student Organizations (RSOs) on campus. 2 RSOs are dedicated to our program: Associated Construction Students and Sigma Lambda Chi. Additionally Women in Technology RSO serves the entire College of Engineering Technology. To learn more about these organizations, click below:

[Student Organizations](#)

Student Scholarships & Awards

SCHOLARSHIPS

Our students are eligible for many different scholarships offered at Ferris State University. The program manages several scholarships that are dedicated to students enrolled in our program:

- Alton "Andy" and Evelyn Brayton Memorial Scholarship Endowment
- American Society of Professional Estimators Chapter 70 Endowed Scholarship
- American Subcontractors Association of Michigan Endowed Scholarship
- Barton Malow Foundation Scholarship
- Builders Exchange of Grand Rapids & Western Michigan Endowed Scholarship
- Building Bulldogs Scholarship Endowment
- Construction Association of Michigan Don Purdie Memorial Annual Scholarship
- Construction Management Industry Endowment Scholarship
- Duane E. Bremer Endowed Scholarship
- Gerace Construction Endowed Scholarship
- Grand Rapids Chapter of the Construction Specifications Institute "Art Nelson Memorial" Endowed Scholarship
- David L. Hamilton Endowed Scholarship
- Harry Larson Memorial Endowed Scholarship
- Pinnacle Construction Group Endowed Scholarship
- Phillip V and Sylvia M Frederickson Scholarship Endowment
- Pulte Family Foundation Endowed Scholarship
- Rockford Construction Scholarship Endowment
- William "Bill" Scott Roh Superintendent Scholarship Endowment
- John Sebold Memorial Endowed Scholarship
- Robert G. Shilander Scholarship Endowment
- Taggart and Lisa Town Scholarship Endowment
- Wolgast Family Scholarship Endowment

Other outside scholarships that are not managed by the program, but actively seek our students include:

- AACE International Scholarship
- American Concrete Institute
- American Institute of Constructors
- Asphalt Pavement Association of Michigan
- Associated Builders and Contractors
- Associated General Contractors of America (multiple scholarships)
- Builders Foundation Scholarship
- CMAA
- Midwest Roofing Contractors Association
- MITA
- National Association of Women in Construction
- National Housing Endowment Scholarships
- Retail Contractors Association
- Washtenaw Contractors Association Annual Scholarship

[Student Scholarships](#)

AWARDS

Each Spring, the program hosts a luncheon to celebrate student awards, student involvement, and scholarships. Involvement with our different student groups is acknowledged as is participation on our different student competition teams. The Program also presents several awards including:

- Outstanding BCTM Student (2-year degree)
- Outstanding CETM Student (2-year degree)
- Outstanding CONM Student (4-year degree)
- AGC Award (Highest GPA, 4-year degree)
- ABC Award (exceptional student in the program)
- APAM Award (exceptional student, 4-year degree, civil engineering technology focus)
- MK Martin Award (student very involved in program and extra-curricular activities)
- Elzinga & Volkers – Construction Manager (exceptional student leader)
- Elzinga & Volkers – Resource Manager (exceptional student, particularly in estimating)
- Elzinga & Volkers – Field Manager (exceptional student, particularly in on site activities)

Academic Quality Improvement Program

There are 3 components to our Academic Quality Improvement Plan:

[Strategic Plan](#)

[Assessment Plan](#)

[Assessment
Implementation Plan](#)

CONSTRUCTION TECHNOLOGY & MANAGEMENT STRATEGIC PLAN

Mission:

The mission of the Construction Technology and Management Program is to educate students in Building Construction Technology, Civil Engineering Technology – Highway focus, and Construction Management through a broadly based foundation of applicable technical and general education courses that will provide them with highly competitive skills and knowledge, construction related employment opportunities at graduation, and the potential for advancement in their careers.

The Program has two primary Objectives based on this mission:

- Serve the students
- Serve the industry

The Program is focused on the following to ensure it meets those objectives:

1. Maintain a high quality curriculum content by meeting its accrediting body's Student Learning Outcomes
2. Maintain accreditation of the BS Construction Management by the American Council for Construction Education
3. Serve the employment criterion for the construction industry
4. Assist students in acquiring construction related summer employment and employment experiences
5. Assist graduates in finding construction related employment upon graduation
6. Develop professionalism in the students through multiple opportunities
7. Ensure excellence in teaching through a well-staffed and well-qualified faculty
8. Provide experiential learning and teamwork application opportunities

These fall into three major themes within the Program's Strategic Plan: Transformative Educational Experience, Excellence and Opportunities, and Enrollment

Within these themes are goals, as defined on the next page, that can be measured.

Theme #1 Transformative Educational Experience

- Goal #1 Enhance the classroom experience with more “hands-on” labs
- Goal #2 Increase student participation in industry activities and team competition
- Goal #3 Promote personal attention in the classroom and through advising
- Goal #4 Increase faculty and equipment resources to enhance classroom experiences
- Goal #5 Keep Program current with industry knowledge requirements

Theme #2 Excellence and Opportunities

- Goal #1 Incorporate ACCE Student Learning Outcomes throughout curriculum
- Goal #2 Maintain accreditation of Program
- Goal #3 Attract and retain highly qualified faculty
- Goal #4 Encourage faculty professional growth to remain current with industry and educational trends
- Goal #5 Hold students to high academic standards

Theme #3 Enrollment

- Goal #1 Maintain consistent enrollment between 270 and 300 students
- Goal #2 Increase enrollment of females
- Goal #3 Increase enrollment of minorities
- Goal #4 Increase Program support resources to keep supplemental costs affordable for students
- Goal #5 Increase scholarships available to younger students that are renewable

Theme #1 Transformative Educational Experience

Goals	Potential Initiatives and Tactics	Quantitative Metrics	Other Types of Evidence
Enhance the classroom experience with more "hands-on" labs/activities	Revise curriculum to add more labs in the first two years of instruction	Curriculum revision	
Increase student participation in industry activities and team competition	<p>Mandatory participation with ACS for students enrolled in CONM 100</p> <p>Hold an internal competition to make it easier for students to participate</p> <p>Procure additional funding to reduce costs for participation</p>		Student feedback in survey
Promote personal attention in the classroom and through advising	<p>Classroom observation</p> <p>Advisor training for faculty (Program Advisors)</p>	Take attendance at training session(s)	Student feedback in survey
Increase faculty and equipment resources to enhance classroom experiences	<p>Implement a campaign to build an endowment to support classroom materials, equipment, site visits</p> <p>Pursue grants from foundations</p>	<p>Identify potential donors</p> <p>Identify potential foundations for grants</p> <p>Track potential donor contact</p> <p>Track donations</p>	
Keep Program current with industry knowledge requirements	<p>IAB involvement with curriculum changes</p> <p>Review 2-3 courses at each IAB meeting for content</p>		IAB Meeting minutes to confirm discussions

Theme #2 – Excellence and Opportunities

Goals	Potential Initiatives and Tactics	Quantitative Metrics	Other Types of Evidence
Incorporate ACCE Student Learning Outcomes throughout curriculum	Review all courses for content, revise course learning outcomes, and incorporate ACCE Student Learning Outcomes	Approved course outlines to include ACCE SLOs clearly identified	
Maintain accreditation of Program	Complete self-study report Host on-site visit of evaluation team	Receive re-accreditation notification	
Attract and retain highly qualified faculty	Provide market-competitive starting salaries Pursue faculty with applicable teaching experience Continue with faculty overloads until appropriate faculty candidate is identified Develop a mentorship plan for new faculty Provide opportunities for professional development	Comparison of salaries with similar programs Review of resumes or CVs of prospective faculty Student Assessment of Instruction (SAI) results	Encouragement of faculty to seek out professional development opportunities Seek opportunities with IAB members
Encourage faculty professional growth to remain current with industry and educational trends	Continue policy of qualified time off for professional growth Procure additional funding	Track opportunities pursued by faculty	
Hold students to high standards of performance	Increase incoming math requirement Maintain 2.5 GPA required for entry to 300/40 level CONM classes Regular review of assessment results in TracDat	Any changes to admission requirements to be indicated on Program check sheets	

Theme #3 – Enrollment

Goals	Potential Initiatives and Tactics	Quantitative Metrics	Other Types of Evidence
Maintain consistent enrollment between 270 and 300 students	<p>Visits to career fairs at high schools</p> <p>Visits to career tech centers</p> <p>Attend Michigan Construction Career Days and other industry-sponsored events to recruit students</p>	Fall and Spring 4 th Day counts	
Increase enrollment of females	<p>Create new video featuring current female students to explain why they chose construction management</p> <p>Develop promotional materials that are focused toward females</p>	Track number of female students applying and actually enrolling	
Increase enrollment of minorities	<p>Increase visits to urban school districts for career presentation</p> <p>Develop relationships with focused groups</p> <p>Explore developing relationships with minority contractors and associations to help identify potential students</p>	Track number of minority students applying and actually enrolling	
Increase Program support resources to keep supplemental costs affordable for students	Endowment campaign noted in Theme #1	Same as in Theme #1	

ASSESSMENT PLAN

The Program has two primary Objectives: Serve our students and serve the industry. Both are assessable. The Program has focused on eight items to ensure it meets those objectives.

1. Maintain a high quality curriculum content by meeting its accrediting body's **Student Learning Outcomes**
2. Maintain accreditation of the BS Construction Management by the American Council for Construction Education
3. Serve the employment criterion for the construction industry
4. Assist students in acquiring construction related summer employment and employment experiences
5. Assist graduates in finding construction related employment upon graduation
6. Develop professionalism in the students through multiple opportunities
7. Ensure excellence in teaching through a well-staffed and well-qualified faculty
8. Provide experiential learning and teamwork application opportunities

The Program Learning Outcome is straightforward: Meet all ACCE Student Learning Outcomes:

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

The Program's assessment is conducted via 2 methodologies:

- Programmatic evaluation
- Curricular evaluation

Programmatic evaluation uses surveys and other historical data to create and adjust the program's goals to meet our mission. These are typically indirect measures of assessment.

- Annual student feedback session with the IAB. The comments are reviewed and every attempt is made to address them within the academic year.
- A senior survey is completed each semester in the capstone course. These results are reviewed after the spring semester each year. The results from these surveys are charted to see if any trends emerge from semester to semester.
- Formal IAB and alumni surveys are completed every three years with the two staggered by three years from each other.
 - The IAB surveys allow the Program to determine how well it is meeting industry's needs and specific student skill sets. .
 - The alumni surveys are issued to alumni that have been in industry for 3 or 6 years to assess what they learned through the Program. These results are also charted tracking how alumni opinions change between 3 and 6 years after graduation.
- Review in the fall of summer employment undertaken by students – type of work, type of company, etc.
- Employment of our graduates is evaluated each year with data from the senior survey including:
 - Average starting salary
 - Number of offers
 - Job acceptance
 - Job acceptance title/responsibilities
 - Type of firm the graduate will be joining

Curricular evaluation evaluates individual course learning outcomes. The Program uses the TracDat system to formally track progress of course outcomes being evaluated as a direct assessment.

Each semester faculty load their direct assessment data into TracDat. They review their own courses for the results and immediately address any assessment values below the minimum threshold established by the Program.

The faculty unit meets throughout each semester to review 5-6 classes in depth. This allows each class to be reviewed by the entire unit every three years. This keeps it in sequence with the Grand Rapids cohort of students which is also on a three-year cycle. For the first cycle, the classes are selected following the order of the Program's check sheets. Subsequent cycles will have the 5-6 classes selected randomly. The faculty review: course objectives, content, delivery method (lecture or lecture/lab), classroom needs, equipment needs, software needs, how the course meets any ACCE SLOs.

At the end of the academic year, the faculty meet to review the senior survey (indirect assessment) and the overall curriculum.

Every fall, the junior and senior students meet with the IAB for a feedback session. The results are shared in the IAB meeting. Faculty discuss any issues and possible resolutions at the preceding faculty meeting.

Every three years, the Program completes a comprehensive review of the entire process and updated with plans for improvement. This incorporates a review of SLOs in classes being introductory, reinforced, or mastered.

ASSESSMENT IMPLEMENTATION PLAN

FALL SEMESTER

SPRING SEMESTER

Review 5 classes and their SLOs

Review 5-6 classes and their SLOs

Year 1

Student feedback session with IAB

Review Program Objectives and Learning Outcomes

IAB or Alumni Survey Issued

Review 5 classes and their SLOs

Review 5-6 classes and their SLOs

Year 2

Student feedback session with IAB

Review Program Objectives and Learning Outcomes

Review 5 classes and their SLOs

Review 5-6 classes and their SLOs

Year 3

Student feedback session with IAB

Review Program Objectives and Learning Outcomes

Review entire process and update with plans for improvement

2021 Results

Our accrediting body, American Council for Construction Education (ACCE) has 20 Student Learning Outcomes (SLOs) required of graduates from accredited programs.

Each SLO must be assessed at least twice. One method can be direct (such as a homework assignment or a text) and one can be indirect (such as a survey of employers)

Direct assessment results are indicated, tracking the percentage of students achieving a specific threshold established for each SLO.

Indirect assessment results were not completed for this cycle

The level of knowledge assessed within an SLO in a course taught in the construction management program is indicated via a letter:

- I = Introductory
- R = Reinforcement
- M = Mastery

The assessment results were reviewed by the Construction Technology & Management Program Faculty and revisions to the assessment plan for the SLOs were made. Some assessment items listed may not have any results as they are recent additions to the curriculum and thus the assessment plan. The curriculum will have been fully implemented by 2020-2021, so results will show in the year 2021 assessment

Courses taught outside of the program that support the SLOs are included with each SLO

A curriculum revision has been submitted this academic year and should show in our 2022 - 2023 academic year results. The next review of all assessment results will occur in August 2023.

SLO #1		Create written communication appropriate to the construction discipline			Direct Assessments	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
R	BCTM 217 Virtual Design and Construction	Assignment	Create written documentation for a 3D model	Create a report with model information	100% achieved a 70% or better	NA
I	CONM 116 Construction Graphics	Project	Create representations of a structure with the appropriate nomenclature and dimensions in two dimensions by hand	Final project - student will design and hand draft floor plan, elevation, and an isometric	83% achieved a 70% or better	YES
I, R	CONM 116 Construction Graphics	Project	Create representations of a structure with the appropriate nomenclature and dimensions in three dimensions on the computer	Final project - student will create a three-dimensional model on the computer of their final project	96% achieved a 70% or greater	YES
I, R	CONM 117 Construction Building Information Technology	Tets - Internal	Manipulate or create word processing documents, spreadsheets, and presentation software	Midterm exam with Word, Excel, Powerpoint	83% achieved a 70% or better	YES
I	CONM 121 Materials Properties & Testing	Written Product (Lab Report)	Generate lab reports for appropriate tests conducted during labs	Lab reports for appropriate tests performed on different materials in lab	75% achieved a 70% or better	YES
M	CONM 499 Construction Project Management	Written Product	Create technical memoranda on student team project	Group site plan created with considerations explained	100% achieved a 70% or better	YES

SLO #2		Create oral presentation appropriate to the construction industry			Direct Assessments	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 424 Safety & Management	Oral Presentation	Present on a specific safety topic	Oral presentation evaluates organization and structure; content and relevance; analysis and conclusion; verbal communication; visual communication	100% achieved a 70% or better	YES
R	CONM 499 Construction Project Management	Oral Presentation	Oral presentation by team of entire project - schedule, estimate, site logistics, QA/QC, safety plan, environmental plan	Oral presentation evaluated on dress, professionalism project knowledge, organization, quality, project approach, key responsibilities defined, addressing Owner concerns, responding to questions	100% of teams achieved a 70% or better	YES

SLO #3		Create a construction safety plan			Direct Assessments	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 111 Construction Practices	Assignment	Prepare a tool use safety presentation	Students create a tool use safety presentation for class	100% achieved a 65% or better	YES
R	CONM 424 Safety & Management	Test - Internal	Students must have a basic understanding of the management of safety in order to develop site safety plans	Basic management of safety knowledge is assessed	96% achieved a 70% or better	YES
R	CONM 424 Safety & Management	Assignment	Develop a site specific safety plan from the viewpoint of an assigned trade subcontractor	Student groups created a site specific safety plan from the aspect of a specific trade	100% achieved a 70% or better	YES

SLO #4		Create construction project cost estimates			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CETM 215 Construction Equipment and Operations	Assignment	Determine ownership and operation cost of construction equipment	Calculate total hourly operating costs for 2 different pieces of equipment	95% achieved a 70% or better	YES
I	CONM 211 Construction Estimating I	Assignment	Use R.S.Means to procure unit costs, city indexes, and crew information	Use estimating guide to determine equipment and labor unit costs based on production rates	88% achieved a 75% or better	YES
I	CONM 211 Construction Estimating I	Assignment	Complete various quantity takeoffs	Complete an estimate for concrete items (footings, foundations, walls, slab on grade) in a small commercial project	78% achieved a 75% or better	YES
I	CONM 211 Construction Estimating I	Test - Internal	Complete a bid proposal	Final exam with QTO of 2 work categories, analysis of subcontractor quotes, prepare an estimate and bid proposal form	96% achieved a 75% or better	YES
R	CONM 321 Construction Estimating II	Assignment	Conceptually estimate a project using 3 different methods	Complete an estimate via Square Foot Method; Square Foot Project Size Modified; and Square Foot Cost Model Method	96% achieved a 75% or better	YES
R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Create an estimate using Excel	Create an estimate program for building concrete components utilizing advanced commands	91% achieved a 70% or better	YES
R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to perform take-offs of earthwork related activities.	Complete a sitework takeoff for earthwork, building foundations and parking lots.	91% achieved a 70% or better	YES
R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to perform take-offs of building components	Takeoff specific building components using a software program with PDFs of drawings	96% achieved a 70% or better	YES

SLO #5		Create construction project schedules			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 222 Construction Administration	Assignment	Identify different scheduling methods, define scheduling terms, estimate the duration of given activities	Identify different scheduling methods, estimate specific activity durations and determine the maximum activity duration	76% achieved a 75% or better	YES
R	CONM 312 Construction Scheduling	Assignment	Activity delineation and activity duration	Develop an activity list and activity durations from project drawings	55.5% achieved a 75% or better	NO*
R	CONM 312 Construction Scheduling	Assignment	Create a project schedule using a scheduling software program	Create a schedule with given activities and responsibilities and generate a classic schedule report, logic report, Gantt chart, and schedule log for	77.8% achieved a 75% or better	YES
R	CONM 312 Construction Scheduling	Test - Internal	Create a project schedule as a network diagram and a bar chart	Determine predecessors of activities and generate a project schedule with a network logic diagram and a project bar chart	88.9% achieved a 75% or better	YES

* Will increase emphasis on how to break down activities and estimate durations of activities

SLO #6		Analyze professional decisions based on ethical principles			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 211 Construction Estimating I	Test - Internal	Identify ethical issues in bidding scenarios	Select the appropriate ethical response to a situation	77% achieved a 70% or better	YES
R, M	CONM 373 Professionalism and Ethics in Construction	Written Product	Interview with a construction professional regarding ethical situations typical to construction	Class not active until Spring 2020	NA	NA
R	CONM 424 Safety & Management	Assignment	Analyze a current case study highlighting ethical issues regarding safety	Describe an ethical dilemma, list any OSHA violations, recommend appropriate responses for different individuals on a project site, list any potential ramifications of being a Whistle Blower in this instance	100% achieved a 70% or better	YES
R	CONM 461 Sustainability in Construction	Assignment	Procure a construction company's code of ethics in another state	Summarize the code of ethics	92% achieved a 70% or better	YES
R	CONM 462 Power and Process Plant Construction	Test - Internal	Evaluate construction industry ethical case studies	Define major ethical theories and describe how to apply them to situations	88% achieved a 70% or better	YES
R	CONM 499 Construction Project Management	Test - Internal	Define ethical behavior	Define some characteristics of ethical/nonethical behavior	100% achieved a 70% or better	YES

SLO #7		Analyze construction documents for planning and management of construction processes			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 112 Plans and Specifications	Test - Internal	Identify construction materials required for a project using a set of plans and specifications	Final exam - using multiple sets of drawings and specifications, interpret what the A/E has intended for construction	93% achieved a 70% or higher	YES
R	CONM 222 Construction Administration	Certification Exam	Use construction documentation software for project information/paperwork coordination	Complete the Procore Project Manager Core Tools certificate and at least two of the following: Project Management; Quality & Safety; Superintendent; Engineer; Subcontractor	100% achieved a 70% or better	YES
R	CONM 225 Field Engineering	Test - Internal	Examine soil erosion and storm water control for a site	Examine different conditions typically encountered on project sites with soil erosion and storm water controls	97% achieved a 70% or better	YES
R	CONM 225 Field Engineering	Test - Internal	Examine codes, ordinances, regulations, and operations documentation	Determine project management requirements on a typical project	100% achieved a 70% or better	YES
M	CONM 499 Construction Project Management	Written Product	Analyze construction documents to determine a proposed site logistics plan	Prepare a submittal for a site logistics plan	97% achieved a 70% or better	YES

SLO #8		Analyze methods, materials, and equipment used to construct a project			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	BCTM 213 Wood and Steel Framing and Interior Finishes	Test - Internal	Successfully perform mathematical requirements and layout for a wood framed wall, stair, and comon/hip/jack rafter	Create a wall drawing and cut list; requirements for a wall layout, stairway, and raters for common/hip/jack rafters	90% achieved a 70% or better	YES
R	CETM 214 Advanced Materials Properties and Testing	Test - Internal and Written Product (Lab Report)	Calculate FAA aggregate proportions	Analyze and blend aggregate, calculate and plot aggregate gradation blends, test and identify aggregate properties, and calculate hot mix asphalt volumetrics and prposed mix designs	88% achieved a 70% or better	YES
I	CETM 215 Construction Equipment and Operations	Test - Internal	Determine equipment production and efficiency rates for earthwork and paving equipment used on highway and bridge construction	Determine rates and bid prices for scrapers, compactors, bulldozers, and graders	81% achieved a 70% or better	YES
I	CONM 111 Construction Practices	Test	Determine the materials and equipment required to complete a concrete project	Test #2 on masonry and concrete (+ resteel) - complete a quantity takeoff from drawings	84% achieved a median grade of 76.9% (criterion was 80% will achieve a 65% or better	YES
I	CONM 121 Materials Properties & Testing	Test - Internal	Utilize material properties knowledge to determine how a material will behave	Determine the behavior of different materials based on the material's mechanics	86% achieved a 70% or better on all 3 tests	YES
I	CONM 212 Soils and Foundations	Test - Internal	Calculate soil bearing capacity	Calculate the soil bearing capacity and the necessary size of a footing to bear on it	82.6% achieved a 70% or better	YES
R	CONM 311 Foundations & Temporary Structures	Test - Internal	Identify the most common materials and methods used in concrete installation	Identify concrete formwork materials, ACI tolerances; complete soils calculations for the formwork; calculate formwork material sizes and quantities	100% achieved a 70% or better	YES
R	CONM 311 Foundations & Temporary Structures	Project	Select formwork members from applied loads and pressures to create a formwork plan	Design formwork for a base slab, wall, draw a diagonal bracing plan for the walls and include a bill of materials required	100% achieved a 70% or better	YES
R	CONM 321 Construction Estimating II	Assignment	Breakdown an assembly into its individual cost components and identify 3 work improvement factors	Identify 3 work improvement factors for a specific situation selected by the student (work fow, safety, production, profits, etc)	96% achieved a 75% or better	YES

SLO #9		Apply construction management skills as a member of a multi-disciplinary team			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	BCTM 234 Electrical Construction Practices	Performance	Each team member is evaluated for their participation in teamwork activities	Class not active until Spring 2020	NA	NA
I	BCTM 235 Mechanical Construction Practices	Performance	Each team member is evaluated for their participation in teamwork activities	Class not active until Spring 2020	NA	NA
I, R	CONM 462 Power and Process Plant Construction	Performance	Each team member is evaluated for their participation in teamwork activities	Each team member represents a different stakeholder in the construction process evaluating a ethics case study and evaluates the others for their contributions to the assignment	88% achieved a 70% or better	YES
I, R	CONM 499 Construction Project Management	Written Product	Each team member is evaluated by the other team members for their participation in teamwork activities	Student groups evaluated the risks associated with a construction site with each student representing a different role in the construction process (e.g. construction manager, subcontractor, public, and local government). Each student wrote the risk assessment from their role's viewpoint. Each team member's evaluations (completed by fellow team members) were compiled by the instructor into a single grade sheet	100% achieved a 70% or better	YES
I, R	CONM 499 Construction Project Management	Test - Internal	Determine the most effective means of building project teams and managing conflict	Evaluate how to lead project teams, manage conflict, manage diversity, manage adversity	100% achieved a 70% or better	YES

SLO #10		Apply electronic-based technology to manage the construction process			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
R	BCTM 217 Virtual Design and Construction	Test - Internal	Use BIM models of a building and site to extract information	Manipulate 3D models of MEP systems	97% achieved a 70% or better	NA
R	BCTM 217 Virtual Design and Construction	Test - Internal	Use BIM models of a building and site to extract information	Clash models of a building's different systems to find interferences	95% achieved a 70% or better	NA
R	BCTM 217 Virtual Design and Construction	Assignment	Use BIM models of a building and site to extract information	Create a 3D model of a building with its MEP systems	97% achieved a 70% or better	NA
I	CETM 226 Highway Technology	Assignment	Design road components with associated geometric elements in profile, cross-section, and typical sections	Cross-sections, profiles, and typical sections are drafted in 2D on the computer and evaluated for use of proper elevations, integrity in data entered, use of proper layer control, and formatting	80% achieved a 70% or better	YES
I	CONM 117 Construction Building Information Technology	Test - Internal	Explain how BIM is used in the industry	Final exam	76% achieved a 70% or better	YES
I	CONM 117 Construction Building Information Technology	Project	Building study project that uses plans and specifications from CONM 112 and includes sitework, architecture, and structural components	Evaluate 3D models and drawings created from project by student. Accuracy of print interpretation, inclusion of necessary items, accuracy of items modelled.	70% achieved a 70% or better	YES
I	CONM 211 Construction Estimating I	Assignment	Create a construction estimate using computer software.	Break the estimate down to labor and material costs including waste factors and productivity rates for 4 different concrete items. Work is evaluated on accuracy	88% achieved a 75% or better	YES
I, R	CONM 312 Construction Scheduling	Assignment	Create a project schedule using a scheduling software program	Prepare a schedule for given activities using a software program and generate a classic schedule report, logic report, Gantt chart, and schedule log	100% achieved a 75% or better	YES
I, R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment and Test - Internal	Link and embed information across various MS Office programs	Create a spreadsheet, create a word document and both embed and link the spreadsheet into the document; do the same for presentation software	80% achieved a 70% or better	YES

LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I, R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to complete take-offs of model based projects.	Create takeoffs of earthwork and building components using a software program	91% achieved a 70% or better	YES
I, R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to integrate schedules with 4D software	Create the simulation of a project using 4D software	95% achieved a 70% or better	YES
I, R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction specific software to coordinate 3D models between various stakeholders and improve construction efficiency and communication	Generate a clash test for mechanical, sprinkler, structural, electrical, and architectural systems on a given building	97% achieved a 70% or better	YES
I, R	CONM 324 Advanced Construction Computer Techniques and Technology	Assignment	Utilize construction-specific software to complete 5D model take-offs of model-based projects	Create a quantity take-off from 3D files of architectural, electrical, mechanical, sprinkler, and structural models	96% achieved a 70% or better	YES

SLO #11		Apply basic surveying techniques for construction layout and control			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 111 Construction Practices	Test - Internal	Using the proper equipment, determine a basic project layout	Test with the application of basic construction math, vertical and horizontal measurement as applied to a benchmark and control points. Math is applied to elevation (design) information	84% passed the test with a median grade of 76.9%	YES
I	CONM 122 Construction Surveying & Layout	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises	Lab report with distance measuring application	99% achieved a 70% or better	YES
I	CONM 122 Construction Surveying & Layout	Written Product (Lab Report)	Lab reports, calculations, and field notes for several surveying exercises	Lab report with calculations and layout data for a building and a horizontal curve	95% achieved a 70% or better	YES
R	CONM 225 Field Engineering	Written Product (Lab Report)	Establish and calculate horizontal and vertical control points for construction layout	Lab report showing the establishment of eight new vertical control points from two benchmarks. Separate report to show the establishment of eight horizontal control points	86% achieved a 70% or better	YES
R	CONM 225 Field Engineering	Written Product (Lab Report)	Calculate and perform construction layout	Lab report showing calculations and records of piling locations from construction drawings	97% of students achieved a 70% or better	NO*

* Low score was due to students not completing all of the assignment. Once scores of incomplete reports are removed, results meet the criteria

SLO #12		Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 222 Construction Administration	Assignment	Complete an organization chart for a CM using a specific type of contract; identify the trade worker with the worker description provided by BLS	Complete an organization chart with lines to indicate contractual relationships, identify essential parts of Partnerin workshop, and match the trade worker with the appropriate BLS description	88% achieved a 75% or better	YES
R	CONM 412 Construction Contracts	Assignment	Compare and contrast the standard documents used in the construction industry	Compare General Conditions of the AIA with those from Consensus Docs	96% achieved a 70% or better	YES
R	CONM 412 Construction Contracts	Test - Internal	Describe contractual relationships between construction parties	Describe the primary responsibilities of different roles in the shop drawing submittal process and describe the different contract delivery systems	90% achieved a 70% or better	YES
R	CONM 499 Construction Project Management	Test - Internal	Identify roles, responsibilities, and relationships of project delivery methods	Identify different delivery methods, determine different procurement methods, and evaluate the selection of a professional construction manager	97% achieved a 70% or better	YES

SLO #13		Understand construction risk management			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 412 Construction Contracts	Test - Internal	Identify the impact of delays on a contract and explain "killer clauses"	Match the causes with their resulting impacts/delays and explain "killer clauses"	96% achieved a 70% or better	YES
I	CONM 499 Construction Project Management	Assignment	Evaluate the risks associated with a site logistics plan	Student groups evaluated the risks associated with a construction site with each student representing a different role in the construction process (e.g. construction manager, subcontractor, public, and local government). Each student wrote the risk assessment from their role's viewpoint	100% achieved a 70% or better	YES
I	CONM 499 Construction Project Management	Test - Internal	Explain/identify basic elements of risk analysis	Select the appropriate response to identify the basic elements of risk in construction	100% achieved a 70% or better	YES

SLO #14		Understand construction accounting and cost control			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 222 Construction Administration	Assignment	Calculate average wage rate of a crew, the crew's productivity rate, and actual labor costs	Given labor rates, daily output, crew size, and a quantity, determine crew average wage rate, productivity rate, and labor costs	72% achieved a 75% or better	YES
I	CONM 312 Construction Scheduling	Assignment	Using a precedence network, determine costs for each activity	Determine labor cost, material cost, total activity cost, profit, activity direct cost for a specific item	94.4% achieved a 75% or better	YES
I	CONM 321 Construction Estimating II	Assignment	Calculate specific overhead costs and balance/unbalance the bid	Calculate overhead costs, calculate building permit and performance bond costs, and balance the bid with general conditions and profit distributed among all work items, unbalance the bid to self-perform items, and front end load the bid	96% achieved a 75% or better	YES
I	CONM 321 Construction Estimating II	Assignment	Develop a cash flow projection table and calculate loan costs	Develop a cash flow projection table, determine which option requires the maximum loan amount, amount of interest for the maximum loan amount depending upon different cash flow options	96% achieved a 75% or better	YES

SLO #15		Understand construction quality assurance and control			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CETM 214 Advanced Materials Properties and Testing	Assignment	Generate lab reports for appropriate tests conducted during labs	In lab, analyze and blend aggregate for a trial batch to meet given specifications, test and identify aggregate properties using given criteria, compute volumetrics and proposed mix designs, test trial batches and compare test results to given criteria	82% achieved a 70% or better	YES
I	CONM 222 Construction Administration	Assignment	Obtain a certification that qualifies an individual for using computer software to manage common tasks relevant to specific job role requirements	Achievement of certification for Project Manager (Core Tools), Project Manager Project Management, Project Manager Quality & Safety, Superintendent, Engineer, Subcontractor. Maximum points earned are determined by number of different certifications achieved.	72% achieved a 75% or better	YES
R	CONM 499 Construction Project Management	Test - Internal	Demonstrate basic QA/QC knowledge	Questions involve lab testing, prototypes, items under control of a construction manager, and governing bodies	100% achieved a 75% or better	YES
R	CONM 499 Construction Project Management	Written Product	Complete a project QA/QC plan as part of the student team project	Create a QA/QC plan that includes control processes. Plan is assessed on assigned responsibilities, organization, stored materials, inspections, measurement and calibration, records, controls, and Owner acceptance	100% will achieve a 75% or better	YES

SLO #16		Understand construction project control processes			Direct Assessment	
level	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 312 Construction Scheduling	Assignment	Draw a precedence diagram and the resource usage histograms	Draw a precedence diagram with early start/finish, late start/finish, and float and a resource usage histogram for the early start and late start schedule dates	90% achieved a 75% or better	YES
I	CONM 312 Construction Scheduling	Assignment	Using a precedence network, determine costs for each activity	Determine direct cost components, activity direct cost, total cost, and value	90% achieved a 75% or better	YES
R	CONM 499 Construction Project Management	Test - Internal	Identify project control techniques	Determine appropriate responses and timing for project situations	100% achieved a 70% or better	YES
R	CONM 499 Construction Project Management	Test - Internal	Calculate project status - completion, cost, schedule	Determine the status of a project (percent complete, cost and schedule variances) given a schedule, quantity in place, value in place	100% achieved a 70% or better	YES

SLO #17		Understand the legal implications of contract, common, and regulatory law to manage a construction project			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
R	COM 412 Construction Contracts	Test - Internal	Apply general business law to issues in construction	Three tests throughout the semester on the basics of construction contracts, different construction contract delivery systems, interpreting the contract, killer clauses, insurance, bonds, warranties, change orders, differing site conditions, schedules, li	98% achieved a 70% or better	YES
R	CONM 499	Test - Internal	Apply general business law to issues in construction	Define certain law and labor relations instances	97% achieved a 70% or better	YES

SLO #18		Understand the basic principles of sustainable construction			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CONM 225 Field Engineering	Test - Internal	Different sustainable ratings systems, soils; Low Impact Development	Test - Internal	100% achieved a 70% or better	YES
R	CONM 461 Sustainability	Written Product (Paper)	Write a three page paper investigating a sustainability issue	Content, organization, consistency of style, spelling, grammar are evaluated for a specific sustainability topic	95% achieved a 70% or better	YES
R	CONM 461 Sustainability	Test - Internal	Review a case study regarding a unique method and answer a set of ten questions	Determine solutions to a case study that will achieve LEED Sustainable Sites points for the project	90% achieved a 70% or better	YES

SLO #19		Understand the basic principles of structural behavior			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	CETM 226 Highway Technology	Project + Test - Internal	Determine the appropriate pavement structure given certain traffic loads	Plot sections and profiles in software program and use soil support values to determine proposed pavement design	70% achieved a 70% or better	YES
I	CONM 212 Soils and Foundations	Test - Internal	Determine required foundation sizes given certain soil parameters and characteristics	Determine a concrete pile's axial capacity with given sizes, soils type, and safety factors	80% achieved a 70% or greater	YES
I	CONM 221 Statics & Structures	Test - Internal	Apply structural analysis and design methods for different construction materials	Calculate resultant forces, beam end reactions, truss forces, the centroid of a shape, shear diagram for a beam	85% achieved a 70% or better	YES
R	CONM 311 Formwork & Temporary Structures	Test - Internal	Calculate form pressures and draw the pressure envelope	Given different placement rates, concrete density, slump and temperatures, and concrete additives, and vibration, calculate the form pressures and draw the pressure envelope	85% achieved a 70% or better	YES
R	CONM 311 Foundations & Temporary Structures	Assignment	Select formwork members from applied loads and pressures to create a formwork plan	Design formwork for a base slab, wall, draw a diagonal bracing plan for the walls and include a bill of materials required	100% achieved a 70% or better	YES

SLO #20		Understand the basic principles of mechanical, electrical, and piping systems			Direct Assessment	
LEVEL	COURSE #	METHOD	ASSESSMENT	ASSESSMENT METHOD	LATEST RESULTS (2021)	CRITERION MET?
I	BCTM 234 Electrical Construction Practices	Test - Internal	Explain the basic principles of construction electrical systems	Explain the basic principles of construction electrical systems	76% achieved a 70% or better	YES
I	BCTM 235 Mechanical Construction Practices	Test - Internal	Explain the basic principles of construction mechanical systems	Explain the basic principles of construction mechanical systems	82% achieved a 70% or better	YES
I	CETM 227 Hydraulics and Hydrology	Test - Internal	Perform hydrodynamic calculations on fluids in open and closed conduits	Determine flow in different conduits	80% achieved a 70% or better	YES
R	CONM 462 Power and Process Plant Construction	Test - Internal	Identify the main components of different process and instrumentation diagrams	Test with diagrams and construction drawings used to identify process and instrumentation diagrams for power generation, general industry, the textile industry, paper plant, food processing plant, brewery, and oil refinery	95% achieved a 70% or better	YES
R	CONM 463 Infrastructure Construction	Test - Internal	Describe the main components of MEP systems in civil projects	Course will be new in Fall 2020	93% achieved a 70% or better	YES